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State of Washington

# Data Summary and Analysis 1987 Traffic Collisions

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Washington Traffic Safety Commission
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# Part II
# Overall Statewide Problem Analysis

# Highway Safety Plan Part II
# Overall Statewide Problem Analysis


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# Statewide Summary

## Overview

The number of persons killed on the state's highways in 1987 totalled 790, a 6.2% increase from the 1984-1986 three-year baseline average of 744. There was a 4.8% increase in the total number of fatal collisions for 1987 compared to the average for 1984-1986. Increases for 1987 over the three-year baseline period were recorded in the categories of total collisions, injury collisions, total number of persons injured and property damage only collisions (Table 1-1).

Table 1-1

SEVERITY OF COLLISIONS
Four Year Comparison

| Impact | Years | | | | Previous 3 Year Average (84-86) | % of Change 87 - 3 Year Average |
|---|---|---|---|---|---|---|
| | 1987 | 1986 | 1985 | 1984 | | |
| Total Collisions | 126,807 | 122,918 | 120,056 | 111,655 | 118,210 | 7.3% |
| Fatal Collisions | 699 | 658 | 656 | 687 | 667 | 4.8% |
| Total Killed | 790 | 714 | 756 | 761 | 744 | 6.2% |
| Injury Collisions | 46,968 | 46,090 | 44,373 | 42,076 | 44,180 | 6.3% |
| Total Injured | 67,665 | 66,707 | 63,806 | 61,366 | 63,960 | 5.8% |
| Property Damage Only Collisions | 79,140 | 76,170 | 75,027 | 68,892 | 73,363 | 7.9% |

## Exposure

An 11.4% increase in motor vehicle miles travelled was recorded for 1987 over the 1984-1986 baseline period. Motor vehicle registration jumped by 7.9% over baseline while the number of licensed drivers was up 5.4%. In 1987 the state's population increased over the 1984-86 average by 2.4% to a total of 4,481,100 persons (Table 1-2).

Table 1-2

VEHICLES AND DRIVERS
Four Year Comparison

| Exposure | Years | | | | Previous 3 Year Average (84-86) | % of Change 87 - 3 Year Average |
|---|---|---|---|---|---|---|
| | 1987 | 1986 | 1985 | 1984 | | |
| Motor Vehicle Travel* ** | 38,520 | 36,416 | 33,980 | 33,344 | 34,580 | 11.4% |
| Motor Vehicle Registration | 3,833,058 | 3,651,102 | 3,546,152 | 3,459,772 | 3,552,342 | 7.9% |
| Licensed Drivers | 3,156,600 | 3,029,375 | 2,980,717 | 2,973,468 | 2,994,520 | 5.4% |
| State's Population | 4,481,100 | 4,419,700 | 4,384,100 | 4,328,100 | 4,377,300 | 2.4% |

*In Millions
**Preliminary Estimate for 1986

## Rates

The 1987 motor vehicle traffic death rate was the second lowest in the state's history; down 5.1% from the previous 3 year average, but up 4.6% from the 1986 rate of 1.96, the lowest on record. The rate of 1.76 injuries per one million vehicle miles in 1987 was down slightly from the 1.83 rate for 1986 and down from the 1.85 rate recorded for the baseline period (Table 1-3).

Table 1-3

DEATH AND INJURY RATES
Four Year Comparison

| Rates | Years | | | | Previous 3 Year Average (84-86) | % of Change 87 - 3 Year Average |
|---|---|---|---|---|---|---|
| | 1987 | 1986 | 1985 | 1984 | | |
| Death Rate (Deaths per 100M vehicle miles) | 2.05 | 1.96 | 2.22 | 2.28 | 2.16 | -4.9% |
| Injury Rate (Injury per 1M vehicle miles) | 1.76 | 1.83 | 1.88 | 1.84 | 1.85 | -5.0% |

## Fatalities By Status

Drivers continued in 1987 as the most common status of those killed as a result of motor vehicle collisions. Fatalities in this classification increased from 353 in 1986 to 386 in 1987. The 1987 figure increased 4.6% from the average of the three previous years. The number of passengers killed also increased in 1987. Two hundred and four passengers were reported killed in 1987; up 29 or 16.6% over 1986 and up 12 or 6.4% over the 3-year baseline period. The 204 total was also down from the 192 average for the baseline period. The number of motorcycle drivers fatally injured in collisions increased from 71 in 1986 to 87 the following year. Last year's total was up 17 from the three year baseline (Table 1-4).

Table 1-4

PERSONS KILLED BY STATUS
Four Year Comparison

| Status | Years | | | | Previous 3 Year Average (84-86) | % of Change 87 - 3 Year Average |
|---|---|---|---|---|---|---|
| | 1987 | 1986 | 1985 | 1984 | | |
| Drivers (no motorcyclists) | 386 | 353 | 362 | 392 | 369 | 4.6% |
| Passengers | 204 | 175 | 211 | 189 | 192 | 6.4% |
| Pedestrians | 93 | 94 | 89 | 97 | 93 | -0.4% |
| Bicyclists | 18 | 12 | 12 | 11 | 12 | 54.3% |
| Motorcycle Drivers | 86 | 71 | 75 | 62 | 69 | 24.0% |
| Motorcycle Passengers | 3 | 9 | 7 | 10 | 9 | -65.4% |
| TOTAL | 790 | 714 | 756 | 761 | 744 | 6.2% |

## Traffic Collisions, Deaths, Injuries, Travel and Death Rate

The 790 traffic fatalities recorded in 1987 reversed an earlier downward trend experienced in 1985 and 1986. Figure 1-1 depicts the two extremes in recent history of traffic deaths with the high of 1,034 deaths recorded in 1979 and the record low in 1983 with 705 traffic fatalities. Motor vehicle travel in 1987 increased by 5.8% over 1986 to reach an all-time high of 38,520 billion miles (Figure 1-2).

The state's 1987 traffic fatality rate of 2.05 deaths per 100 million vehicle miles of travel continued below the national rate of 2.55 for the year. The 2.05 rate is up slightly from the 1.96 death rate recorded in the previous year of 1986 and was the lowest point in Washington's history. Total reported motor vehicle traffic collisions and injuries increased over 1986. Total collisions were up 3.2% while the number of persons injured rose by 1.4% (Figure 1-4).

## Collision By Type

A 2.8% increase in multiple vehicle collisions over 1986 was recorded in 1987 (Figure 1-5). Single vehicle collisions were down 7.0% (Figure 1-6). Vehicle-pedestrian collisions decreased 1.8% from 1986 (Figure 1-7). Vehicle-pedalcyclist collisions, by contrast, increased by 4.5% in 1987. This is the fourth year where increases in pedalcycle collisions occurred during the past five years (Figure 1-8).

## Traffic Deaths And Vehicle Registration Death Rates By County

In 1987 fatalities ranged from a high of 155 in King County, with a death rate of 1.28 (traffic deaths per 10,000 registered vehicles) to a low of zero deaths in Asotin, Skamania, and Wahkiakum counties. Garfield County recorded the highest death rate at 26.57, computed on seven fatalities, followed by Ferry County, which recorded a 14.03 death rate based on five traffic deaths (Figure 1-9).

## Highways, Travel and Fatalities

The U.S. and State Numbered System (other than the Interstate System) was the most-traveled road system in the state, recording 11.004 billion miles The interstate system continued to have the lowest death rate of all the state systems, with a 0.68 rate recorded in 1987, up slightly from the 0.66 rate recorded in 1986. Travel on city streets increased to 9.670 billion miles in 1987 and recorded a death rate of 1.20, down from 1.52 in 1986. County roads were traveled 8.076 billion miles and recorded a death rate of 3.36 in 1987, an increase from the previous year's 3.25 rate. Total motor vehicle travel in the state increased from 36.416 billion miles to 38.520 billion in 1987 (Table 1-5).

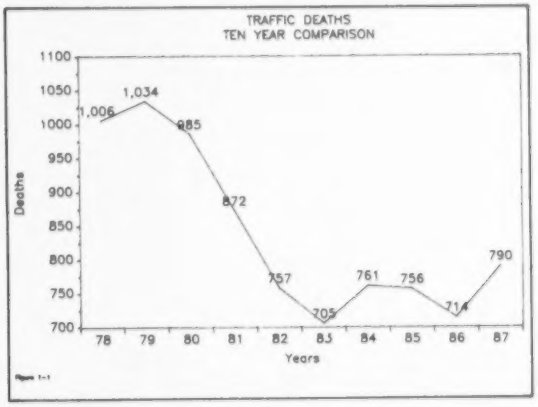
Table 1-5

HIGHWAYS, TRAVEL, AND ACCIDENTS
By Type of Highway

| Type of Highways | Highways | | Vehicle Miles Traveled+ | | Accidents | | |
|---|---|---|---|---|---|---|---|
| | Miles | % of Total | Miles (Millions) | % of Total | Total Collisions | Total Fatalities | Death Rate for CMVM* |
| Interstate System** | 755 | 0.95% | 9,681 | 25.13% | 11,624 | 66 | 0.68 |
| All Other State Highways | 6,220 | 7.82% | 11,004 | 28.57% | 27,992 | 330 | 3.00 |
| County Roads | 41,748 | 52.51% | 8,076 | 20.97% | 28,372 | 271 | 3.36 |
| City Streets | 11,245 | 14.14% | 9,670 | 25.10% | 57,911 | 116 | 1.20 |
| All Other Traffic Ways*** | 19,541 | 24.58% | 89 | 0.23% | 908 | 7 | 7.87 |
| TOTAL | 79,509 | 100.00% | 38,520 | 100.00% | 126,807 | 790 | 2.05 |

+Preliminary Estimates
*Fatalities per hundred million vehicle miles, based on roadway travel as reported by the Dept. of Transportation.
**Does not include traveled way.
***Does not include (all terrain vehicle) trails.

## Figure 1-1




## Figure 1-2

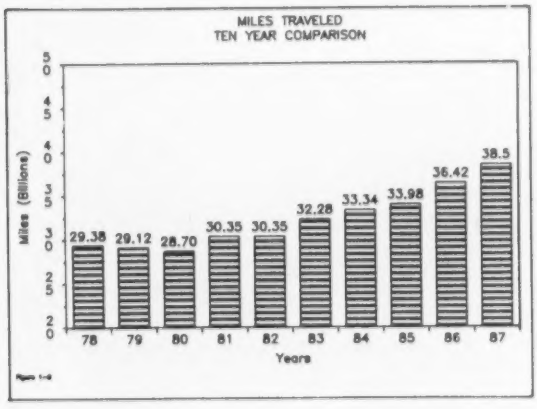


**Figure 1-3**

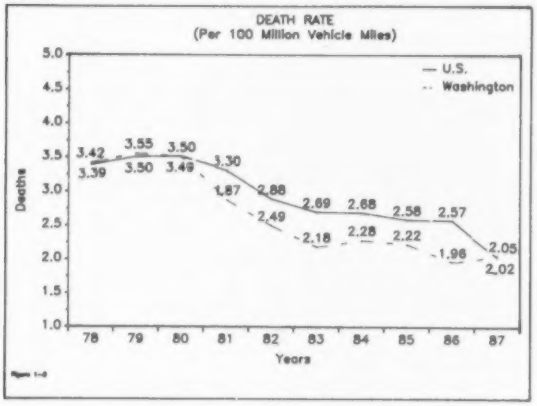



**Figure 1-4**

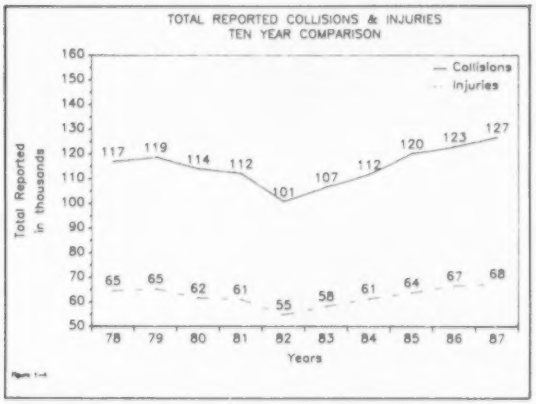

TOTAL REPORTED COLLISIONS & INJURIES
TEN YEAR COMPARISON
— Collisions
-- Injuries
Total Reported in thousands
Years
78 79 80 81 82 83 84 85 86 87
117 119 114 112 101 107 112 120 123 127
65 65 62 61 55 58 61 64 67 68

**Figure 1-5**

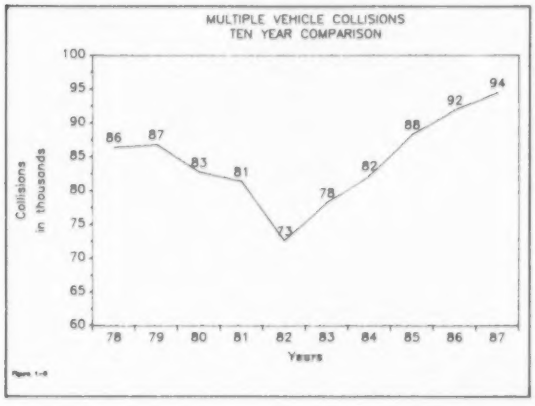

MULTIPLE VEHICLE COLLISIONS
TEN YEAR COMPARISON
Collisions in thousands
Years
78 79 80 81 82 83 84 85 86 87
86 87 83 81 73 78 82 88 92 94

**Figure 1-6**

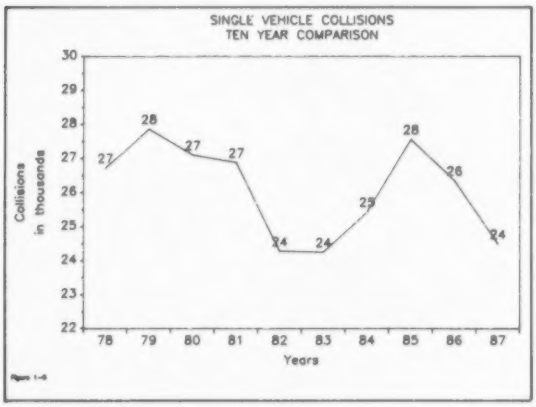



**Figure 1-7**

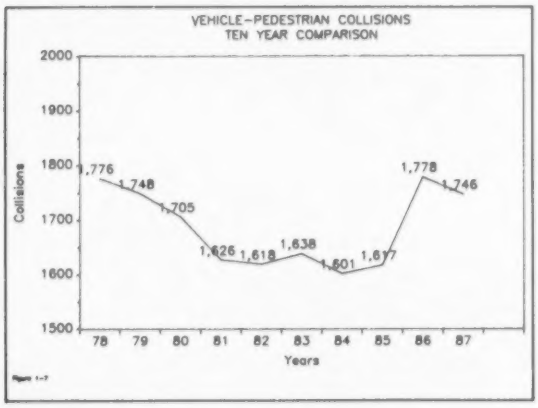



**Figure 1-8**

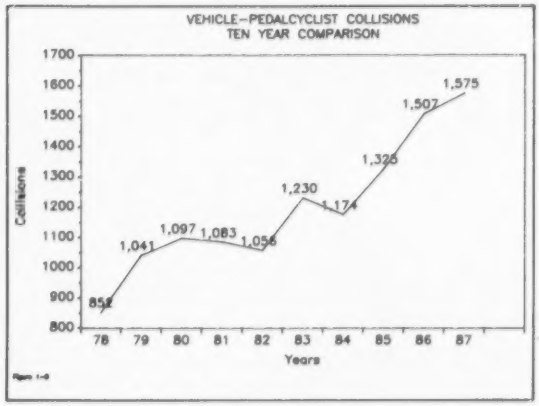
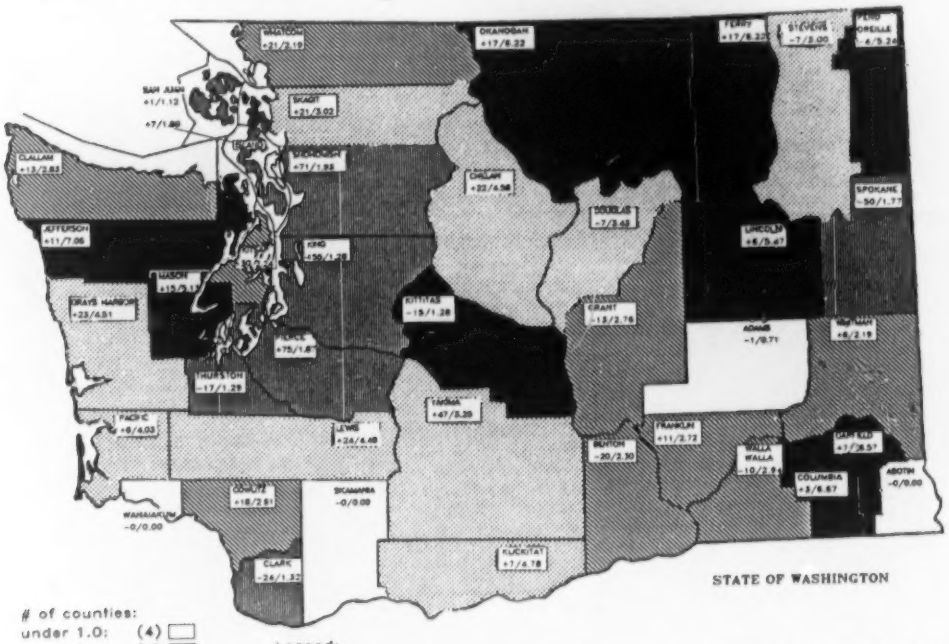


**Figure 1-9**




Traffic deaths and vehicle registration death rate by county – 1987 (deaths per 10,000 registered vehicles). Statewide registration rate – 2.06.

**Figure 1-10**

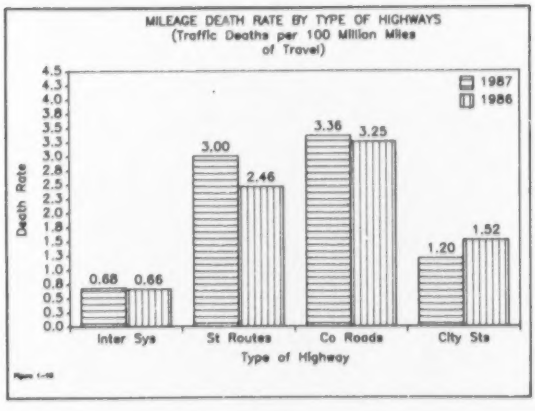


**Figure 1-11**

## *Traffic Fatalities*

In 1987 and Percent of Change from 1986

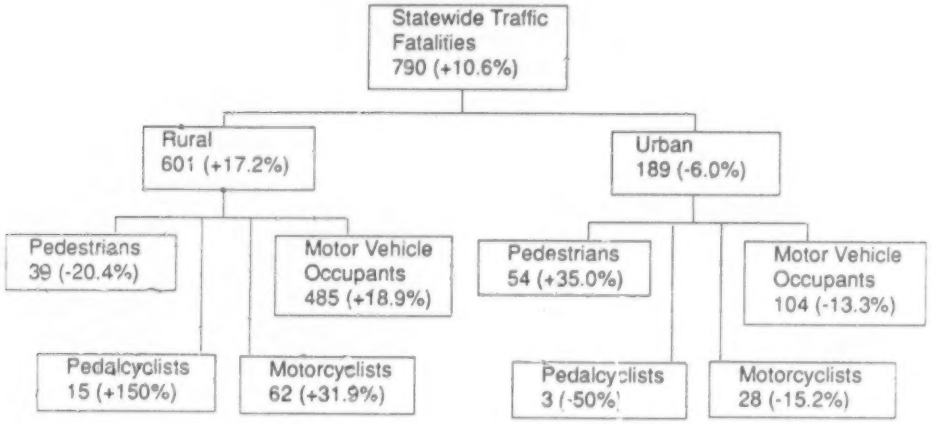



**Figure 1-12**

## *Traffic Fatalities by Age and Sex*

1987

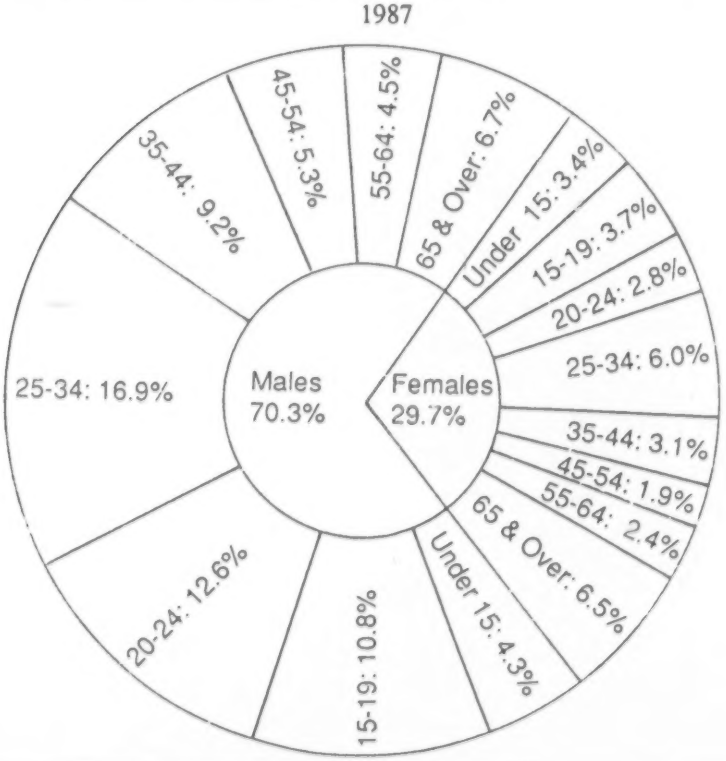


Table 1-6

PERSONS KILLED AND INJURED
By Age By Status

| Age | Total | | Occupants | | Pedestrians | | Pedalcyclists | |
|---|---|---|---|---|---|---|---|---|
| | Killed | Injured | Killed | Injured | Killed | Injured | Killed | Injured |
| 0 - 4 | 22 | 1,106 | 17 | 988 | 5 | 92 | 0 | 23 |
| 5 - 9 | 24 | 1,887 | 15 | 1,351 | 5 | 251 | 4 | 284 |
| 10 - 14 | 15 | 2,086 | 6 | 1,443 | 6 | 196 | 3 | 444 |
| 15 - 19 | 114 | 12,044 | 105 | 11,536 | 7 | 206 | 2 | 302 |
| 20 - 24 | 121 | 11,148 | 117 | 10,825 | 2 | 166 | 2 | 155 |
| 25 - 34 | 180 | 15,691 | 163 | 15,224 | 14 | 289 | 3 | 166 |
| 35 - 44 | 96 | 9,627 | 84 | 9,360 | 11 | 196 | 1 | 63 |
| 45 - 54 | 57 | 4,856 | 44 | 4,725 | 11 | 108 | 2 | 20 |
| 55 - 64 | 54 | 3,318 | 42 | 3,217 | 11 | 84 | 1 | 13 |
| 65 - 74 | 42 | 2,309 | 35 | 2,208 | 7 | 83 | 0 | 17 |
| 75/Older | 62 | 1,307 | 48 | 1,226 | 14 | 76 | 0 | 2 |
| Not Stated | 3 | 2,286 | 3 | 2,138 | 0 | 83 | 0 | 63 |
| TOTAL* | 790 | 67,665 | 679 | 64,241 | 93 | 1,830 | 18 | 1,552 |

*Total Injured includes 42 injured where the status of the injured was unknown

Table 1-7

COMPARISON OF TRAFFIC DEATHS BY MONTH
Three Year Comparison

| Month | 1987 | | 1986 | | 1985 | | % Change 87 to 86 | |
|---|---|---|---|---|---|---|---|---|
| | Month Total | Year To Date | Month Total | Year To Date | Month Total | Year To Date | Month Total | Year To Date |
| January | 54 | 54 | 42 | 42 | 43 | 43 | 28.6% | 28.6% |
| February | 52 | 106 | 28 | 70 | 48 | 91 | 85.7% | 51.4% |
| March | 62 | 168 | 56 | 126 | 52 | 143 | 10.7% | 33.3% |
| April | 55 | 223 | 60 | 186 | 61 | 204 | -8.3% | 19.9% |
| May | 50 | 273 | 73 | 259 | 84 | 288 | -31.5% | 5.4% |
| June | 77 | 350 | 73 | 332 | 67 | 355 | 5.5% | 5.4% |
| July | 73 | 423 | 70 | 402 | 87 | 442 | 4.3% | 5.2% |
| August | 84 | 507 | 69 | 471 | 63 | 505 | 21.7% | 7.6% |
| September | 90 | 597 | 51 | 522 | 66 | 571 | 76.5% | 14.4% |
| October | 69 | 666 | 67 | 589 | 66 | 637 | 3.0% | 13.1% |
| November | 73 | 739 | 64 | 653 | 56 | 693 | 14.1% | 13.2% |
| December | 51 | 790 | 61 | 714 | 63 | 756 | -16.4% | 10.6% |

Table 1-8

COLLISIONS
By Time

| Time Hour Reporting | Total | | | Monday - Thursday | | | Friday - Sunday | | |
|---|---|---|---|---|---|---|---|---|---|
| | All | Injury | Fatal | All | Injury | Fatal | All | Injury | Fatal |
| Midnight | 3,365 | 1,298 | 32 | 1,210 | 442 | 12 | 2,155 | 856 | 20 |
| 1:00 | 3,157 | 1,370 | 31 | 1,073 | 469 | 8 | 2,084 | 901 | 23 |
| 2:00 | 3,006 | 1,237 | 41 | 993 | 403 | 14 | 2,013 | 834 | 27 |
| 3:00 | 1,571 | 627 | 28 | 506 | 200 | 10 | 1,065 | 427 | 18 |
| 4:00 | 1,124 | 442 | 13 | 453 | 176 | 5 | 671 | 266 | 8 |
| 5:00 | 1,320 | 525 | 17 | 701 | 269 | 7 | 619 | 256 | 10 |
| 6:00 | 2,658 | 963 | 17 | 1,799 | 649 | 6 | 859 | 314 | 11 |
| 7:00 | 5,466 | 1,986 | 21 | 4,030 | 1,464 | 15 | 1,436 | 522 | 6 |
| 8:00 | 4,646 | 1,637 | 27 | 3,255 | 1,139 | 15 | 1,391 | 498 | 12 |
| 9:00 | 4,153 | 1,369 | 12 | 2,579 | 836 | 4 | 1,574 | 533 | 8 |
| 10:00 | 4,992 | 1,644 | 15 | 3,018 | 996 | 9 | 1,974 | 648 | 6 |
| 11:00 | 6,277 | 2,205 | 18 | 3,781 | 1,258 | 11 | 2,496 | 947 | 7 |
| Noon | 7,295 | 2,589 | 30 | 4,146 | 1,432 | 14 | 3,149 | 1,157 | 16 |
| 1:00 | 7,299 | 2,634 | 26 | 4,036 | 1,404 | 15 | 3,263 | 1,230 | 11 |
| 2:00 | 8,555 | 3,066 | 26 | 4,995 | 1,793 | 13 | 3,560 | 1,273 | 13 |
| 3:00 | 10,023 | 3,793 | 38 | 6,156 | 2,314 | 25 | 3,867 | 1,479 | 13 |
| 4:00 | 10,744 | 4,045 | 36 | 6,571 | 2,474 | 18 | 4,173 | 1,571 | 18 |
| 5:00 | 10,657 | 4,170 | 39 | 6,614 | 2,592 | 21 | 4,043 | 1,578 | 18 |
| 6:00 | 7,327 | 2,956 | 36 | 4,148 | 1,655 | 14 | 3,179 | 1,301 | 22 |
| 7:00 | 5,755 | 2,304 | 43 | 3,029 | 1,193 | 25 | 2,726 | 1,111 | 18 |
| 8:00 | 4,560 | 1,819 | 34 | 2,287 | 918 | 19 | 2,273 | 901 | 15 |
| 9:00 | 4,572 | 1,753 | 38 | 2,367 | 922 | 18 | 2,205 | 831 | 20 |
| 10:00 | 4,223 | 1,641 | 38 | 1,885 | 753 | 18 | 2,338 | 888 | 20 |
| 11:00 | 4,062 | 1,594 | 43 | 1,730 | 687 | 17 | 2,332 | 907 | 26 |
| TOTAL | 126,807 | 47,667 | 699 | 71,362 | 26,438 | 333 | 55,445 | 21,229 | 366 |

Table 1-9

COLLISION RATES BY COUNTY POPULATION
1987

| County | 1987 Population | Traffic Deaths | | Traffic Injuries | | Total Collisions | |
|---|---|---|---|---|---|---|---|
| | | Number | Rate* | Number | Rate** | Number | Rate** |
| Over 1,000,000 | | | | | | | |
| 1. King | 1,384,600 | 155 | 11.19 | 24,391 | 17.62 | 48,232 | 34.83 |
| 250,000 to 500,000 | | | | | | | |
| 1. Pierce | 538,000 | 75 | 13.94 | 9,310 | 17.30 | 15,744 | 29.26 |
| 2. Snohomish | 393,600 | 71 | 18.04 | 6,049 | 15.37 | 10,833 | 27.52 |
| 3. Spokane | 355,900 | 50 | 14.05 | 5,450 | 15.31 | 9,616 | 27.02 |
| 100,000 to 250,000 | | | | | | | |
| 1. Clark | 209,900 | 24 | 11.43 | 2,639 | 12.57 | 4,800 | 22.87 |
| 2. Yakima | 184,400 | 47 | 25.49 | 2,202 | 11.94 | 4,497 | 24.39 |
| 3. Kitsap | 168,600 | 30 | 17.79 | 2,051 | 12.16 | 3,696 | 21.92 |
| 4. Thurston | 145,500 | 17 | 11.68 | 1,983 | 13.63 | 3,876 | 26.64 |
| 5. Whatcom | 117,200 | 21 | 17.92 | 1,604 | 13.69 | 2,819 | 24.05 |
| 6. Benton | 104,100 | 20 | 19.21 | 911 | 8.75 | 2,019 | 19.39 |
| 50,000 to 100,000 | | | | | | | |
| 1. Cowlitz | 79,200 | 18 | 22.73 | 1,041 | 13.14 | 1,948 | 24.60 |
| 2. Skagit | 69,500 | 21 | 30.22 | 1,083 | 15.58 | 1,798 | 25.87 |
| 3. Grays Harbor | 63,000 | 23 | 36.51 | 869 | 13.79 | 1,821 | 28.90 |
| 4. Lewis | 57,100 | 24 | 42.03 | 773 | 13.54 | 1,582 | 27.71 |
| 5. Clallam | 53,400 | 13 | 24.34 | 582 | 10.90 | 1,175 | 22.00 |
| 6. Grant | 52,100 | 13 | 24.95 | 478 | 9.17 | 977 | 18.75 |
| 7. Island | 52,100 | 7 | 13.44 | 531 | 10.19 | 803 | 15.41 |
| 25,000 to 50,000 | | | | | | | |
| 1. Chelan | 48,700 | 22 | 45.17 | 617 | 12.67 | 1,382 | 28.38 |
| 2. Walla Walla | 48,300 | 10 | 20.70 | 507 | 10.50 | 999 | 20.68 |
| 3. Whitman | 39,200 | 6 | 15.31 | 379 | 9.67 | 713 | 18.19 |
| 4. Mason | 36,000 | 15 | 41.67 | 482 | 13.39 | 877 | 24.36 |
| 5. Franklin | 35,500 | 11 | 30.99 | 398 | 11.21 | 831 | 23.41 |
| 6. Okanogan | 31,600 | 17 | 53.80 | 408 | 12.91 | 719 | 22.75 |
| 7. Stevens | 30,200 | 7 | 23.18 | 354 | 11.72 | 504 | 16.69 |
| 8. Kittitas | 25,000 | 15 | 60.00 | 525 | 21.00 | 1,062 | 42.48 |
| 10,000 to 25,000 | | | | | | | |
| 1. Douglas | 23,500 | 7 | 29.79 | 225 | 9.57 | 466 | 19.83 |
| 2. Jefferson | 18,100 | 11 | 60.77 | 237 | 13.09 | 437 | 24.14 |
| 3. Pacific | 17,300 | 6 | 34.68 | 247 | 14.28 | 450 | 26.01 |
| 4. Asotin | 17,200 | 0 | 0.00 | 123 | 7.15 | 239 | 13.90 |
| 5. Klickitat | 16,500 | 7 | 42.42 | 206 | 12.48 | 350 | 21.21 |
| 6. Adams | 14,000 | 1 | 7.14 | 251 | 17.93 | 386 | 27.57 |
| Under 10,000 | | | | | | | |
| 1. Lincoln | 9,700 | 6 | 61.86 | 158 | 16.29 | 192 | 19.79 |
| 2. San Juan | 9,200 | 1 | 10.87 | 89 | 9.67 | 153 | 16.63 |
| 3. Pend Oreille | 8,900 | 4 | 44.94 | 145 | 16.29 | 202 | 22.70 |
| 4. Skamania | 7,800 | 0 | 0.00 | 119 | 15.26 | 210 | 26.92 |
| 5. Ferry | 6,000 | 5 | 83.33 | 96 | 16.00 | 141 | 23.50 |
| 6. Columbia | 4,100 | 3 | 73.17 | 66 | 16.10 | 108 | 26.34 |
| 7. Wahkiakum | 3,600 | 0 | 0.00 | 53 | 14.72 | 97 | 26.94 |
| 8. Garfield | 2,400 | 7 | 291.67 | 33 | 13.75 | 53 | 22.08 |
| TOTAL | 4,481,000 | 790 | 17.63 | 67,665 | 15.10 | 126,807 | 28.30 |

*Frequency per 100,000 population
**Frequency per 1,000 population

Table 1-10

COLLISION RATES BY CITY POPULATION*
1987

| City | 1987 Population | Traffic Deaths | | Traffic Injuries | | Total Collisions | |
|---|---|---|---|---|---|---|---|
| | | Number | Rate** | Number | Rate*** | Number | Rate*** |
| 250,000 and Over | | | | | | | |
| 1. Seattle | 491,300 | 46 | 9.36 | 9,143 | 18.61 | 19,993 | 40.69 |
| 100,000 to 250,000 | | | | | | | |
| 1. Spokane | 172,100 | 14 | 8.13 | 3,385 | 19.67 | 6,294 | 36.57 |
| 2. Tacoma | 158,900 | 13 | 8.18 | 3,459 | 21.77 | 6,138 | 38.63 |
| 50,000 to 100,000 | | | | | | | |
| 1. Bellevue | 82,070 | 5 | 6.09 | 949 | 11.56 | 2,359 | 28.74 |
| 2. Everett | 60,100 | 11 | 18.30 | 1,146 | 19.07 | 2,295 | 38.19 |
| 25,000 to 50,000 | | | | | | | |
| 1. Yakima | 49,600 | 3 | 6.05 | 788 | 15.89 | 1,915 | 38.61 |
| 2. Bellingham | 46,360 | 2 | 4.31 | 601 | 12.96 | 1,328 | 28.65 |
| 3. Vancouver | 43,390 | 1 | 2.30 | 588 | 13.55 | 1,380 | 31.80 |
| 4. Kennewick | 37,320 | 3 | 8.04 | 351 | 9.41 | 843 | 22.59 |
| 5. Renton | 35,360 | 4 | 11.31 | 711 | 20.11 | 1,702 | 48.13 |
| 6. Bremerton | 32,390 | 4 | 12.35 | 506 | 15.62 | 1,123 | 34.67 |
| 7. Richland | 30,280 | 1 | 3.30 | 247 | 8.16 | 547 | 18.06 |
| 8. Redmond | 30,260 | 0 | 0.00 | 453 | 14.97 | 906 | 29.94 |
| 9. Auburn | 30,260 | 1 | 3.30 | 512 | 16.92 | 1,058 | 34.96 |
| 10. Kent | 30,090 | 5 | 16.62 | 886 | 29.44 | 1,502 | 49.92 |
| 11. Olympia | 29,600 | 0 | 0.00 | 515 | 17.40 | 1,253 | 42.33 |
| 12. Longview | 29,520 | 2 | 6.78 | 446 | 15.11 | 866 | 29.34 |
| 13. Edmonds | 28,300 | 1 | 3.53 | 241 | 8.52 | 548 | 19.36 |
| 14. Walla Walla | 25,420 | 2 | 7.87 | 258 | 10.15 | 625 | 24.59 |
| 15,000 to 25,000 | | | | | | | |
| 1. Lynnwood | 24,260 | 1 | 4.12 | 648 | 26.71 | 1,265 | 52.14 |
| 2. Pullman | 22,240 | 0 | 0.00 | 128 | 5.76 | 305 | 13.71 |
| 3. Mercer Island | 20,760 | 0 | 0.00 | 70 | 3.37 | 218 | 10.50 |
| 4. Puyallup | 19,830 | 0 | 0.00 | 307 | 15.48 | 714 | 36.01 |
| 5. Kirkland | 19,430 | 2 | 10.29 | 269 | 13.84 | 616 | 31.70 |
| 6. Pasco | 18,520 | 2 | 10.80 | 221 | 11.93 | 559 | 30.18 |
| 7. Wenatchee | 18,480 | 4 | 21.65 | 214 | 11.58 | 614 | 33.23 |
| 8. Port Angeles | 17,260 | 0 | 0.00 | 225 | 13.04 | 482 | 27.93 |
| 9. Aberdeen | 17,000 | 3 | 17.65 | 152 | 8.94 | 592 | 34.82 |
| 10. Mountlake Terrace | 16,060 | 0 | 0.00 | 135 | 8.41 | 263 | 16.38 |
| 12. Lacey | 15,840 | 2 | 12.63 | 218 | 13.26 | 467 | 23.61 |
| 10,000 to 15,000 | | | | | | | |
| 1. Mount Vernon | 14,400 | 1 | 6.94 | 210 | 9.79 | 374 | 20.28 |
| 2. Oak Harbor | 13,960 | 0 | 0.00 | 101 | 9.89 | 208 | 27.94 |
| 3. Des Moines | 13,790 | 1 | 7.25 | 141 | 7.32 | 292 | 15.08 |
| 4. Centralia | 11,830 | 1 | 8.45 | 138 | 4.40 | 390 | 12.76 |
| 5. Ellensburg | 11,500 | 1 | 8.70 | 52 | 14.52 | 151 | 29.91 |
| 6. Kelso | 10,700 | 1 | 9.35 | 167 | 11.68 | 344 | 28.04 |
| 7. Moses Lake | 10,600 | 0 | 0.00 | 125 | 11.79 | 300 | 28.30 |
| 8. Anacortes | 10,160 | 1 | 9.84 | 61 | 6.00 | 130 | 12.80 |
| TOTAL | 1,749,240 | 138 | 7.89 | 28,767 | 16.45 | 60,959 | 34.85 |

*Does not include collisions on limited access roads or freeways
**Frequency per 100,000 population
***Frequency per 1,000 population

# Explanation of Problem Analysis Process

## Explanation of Problem Analysis Process

In developing the Problem Identification section for the 1989 Highway Safety Plan (HSP), problem areas were classified into two basic types: impact problems and system support problems.

Impact problems are those whose factors contribute directly to the occurrence of collisions, fatalities and/or injuries and may be corrected through the implementation of countermeasures designed to reduce the effects of these factors.

System support problems are those deficiencies within vital traffic safety programs whose correction may not be directly reflected in a reduction in traffic collisions, injuries or fatalities.

The basis for impact and system support problem identification, analysis and selection for inclusion into the HSP was done in two ways.

1. Impact problem areas were based on identifying statewide experience in impact areas (where information was available) outlined in the Federal safety standards. Various statewide automated and manual traffic information systems were inventoried and analyzed. The data sources included: Traffic Accident Records, Fatal Accident Reporting System, Driver's Licensing Records, Vehicle Registration Records and Highway/Roadway Information. In most instances, four years' worth of data were gathered as a baseline to serve as a point of comparison to the current year's activity level.
2. The second source for problem identification inclusion in the HSP resulted from analysis by and for various state and local agencies with an interest in highway safety. The Washington Traffic Safety Commission made it known that the two main emphasis areas in FY 1989 were the non-use of occupant restraint systems, and alcohol-related collisions.

## Data Analysis and Statistical Techniques

Data analysis was a key factor in the identification and selection of the traffic problem areas included in this Plan. The analyses were performed to ensure that the conclusions drawn from the data were valid and credible.

The most common data sources in the HSP were the statewide traffic collision records, which were used for identifying the specific traffic problem areas. Four

continuous years (1983-1986) of collision experience were used to serve as a baseline in analyzing traffic collision data. This baseline was used to obtain a better perspective to assess the current year's (1987) experience with traffic problem areas. The baseline also serves to negate short-term changes in collision patterns.

The development of over/under-representation ratios were the most frequently used methods of analysis. Where relevant exposure data were available, the generation of over-representation ratios allow for the comparisons of different subgroups relative to the percentage of the population they comprise. Additionally, county and city rankings were generated for different problem areas to compare geographical and political subdivisions.

### Analysis of Selected Traffic Problems

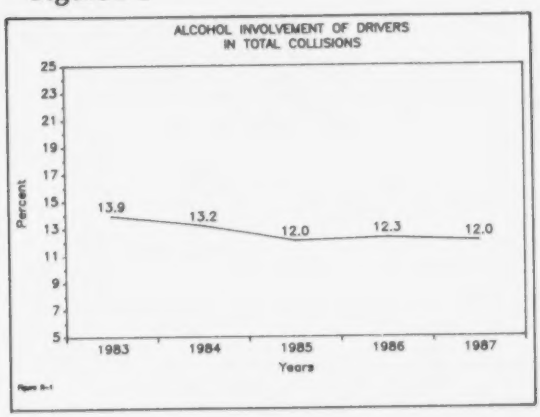
- Alcohol Involvement
- Youth Involvement
- Safety Restraint Usage
- Motorcycle Collisions
- Pedalcycles
- Pedestrians
- Heavy Trucks
- Pupil Transportation
- Contributory Driver Violations
- Vehicle Defects
- Senior Driver Involvement

# Alcohol Involvement

## Overview

In 1987, 12.0% of all drivers involved in traffic collisions had been drinking alcohol. This is a 2.4% decrease from 1986 and continues a downward trend (Figure 2-1).

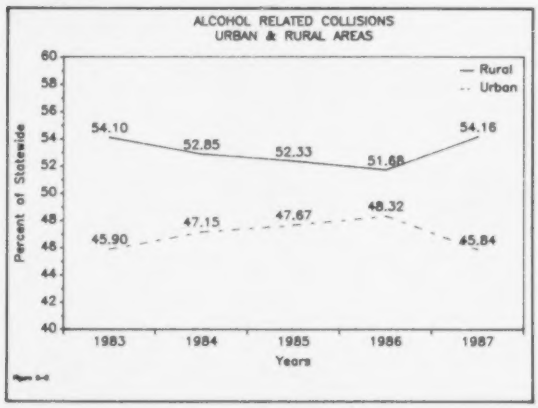
**Figure 2-1**




## Location Of Alcohol Related Collisions

In 1987 the urban-rural breakdown of alcohol-related collisions reversed the trend established in 1984 with a decrease in rural areas and an increase in the urban areas. However, 1987 recorded a decrease in urban alcohol-related collisions and an increase in rural area collisions compared to 1986; 54.16% of the alcohol-related collisions occurred in rural areas and 45.84% in urban areas (Figure 2-2).

**Figure 2-2**




The predominant type of alcohol-related vehicle collisions continued to be multiple-vehicle mishaps in urban areas (Figure 2-3) with the opposite holding true in rural areas (Figure 2-4). Of the urban collisions, 67.4% involved two or more vehicles while only 35.6% were multiple vehicle collisions on rural roads.

**Figure 2-3**

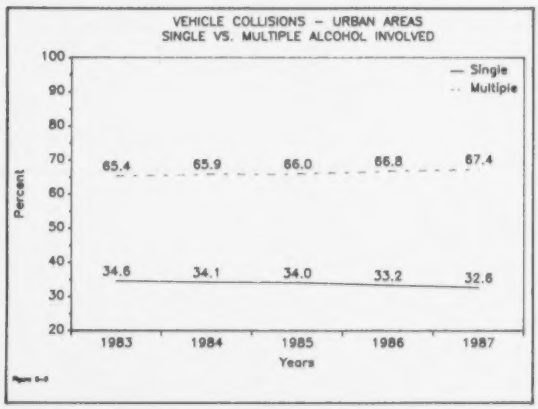
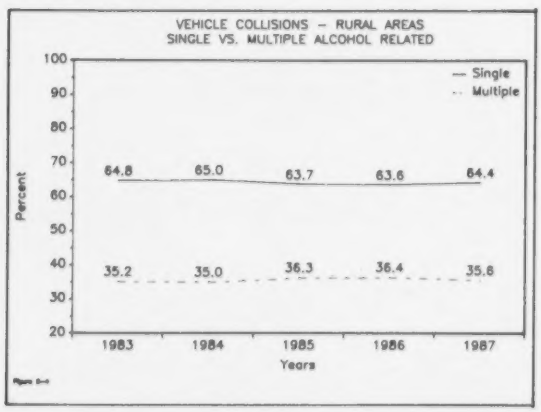


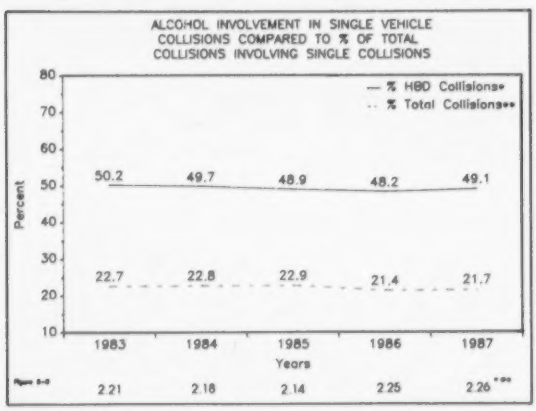

**Figure 2-4**



## Single Vehicle Collisions Involving Alcohol

In 1987 the percentage of all single vehicle collisions where the driver had been drinking remained relatively stable at nearly 50% of the total alcohol involved collisions. By comparison the percentage of total collisions that the single vehicle collision represents was only 21.7% in 1986 (Figure 2-5). Comparing the percentage of alcohol involvement in single vehicle collisions to the percentage of total collisions the single vehicle collision represents allows for the generation of a ratio to express the over-representation of alcohol in single vehicle collisions. In 1987, this ratio increased slightly from 2.25 in 1986 to 2.26 in 1987.

**Figure 2-5**




* Had Been Drinking ** Represented By Single Vehicle *** Ratio

Figure 2-5 shows over-involvement of single vehicle alcohol-involved collisions compared to single vehicle collisions in total collisions.

## Drivers Involved In Fatal Collisions

In 1987, 36.4% of the drivers involved in statewide fatal collisions had been drinking intoxicants. This is a decrease from the 40.4% involvement recorded in 1986 and down from the 39.1% baseline period. In rural areas, 37.7% of the drivers in fatal collisions had been drinking, down 5.8% from the 1983-86 average. In urban areas, 32.5 drivers out of every 100 had been drinking prior to being involved in a fatal collision. This is down 11.7% from the baseline period. (Tables 2-1, 2-1a, 2-1b)

Table 2-1

SOBRIETY OF DRIVERS INVOLVED IN FATAL COLLISIONS
Statewide Comparison

| Condition of Driver (Sobriety) | Years | | | | | Previous 4 Year Average | % of Change 87 - 4 Year Average |
|---|---|---|---|---|---|---|---|
| | 1987 | 1986 | 1985 | 1984 | 1983 | | |
| Had been drinking - ability impaired | 296 | 306 | 292 | 307 | 260 | 291 | 1.63% |
| Had been drinking - ability not impaired | 40 | 51 | 43 | 52 | 37 | 46 | -12.57% |
| Had been drinking - sobriety unknown | 24 | 13 | 11 | 11 | 31 | 17 | 45.45% |
| Had not been drinking | 630 | 546 | 577 | 574 | 502 | 550 | 14.60% |
| Not stated | 46 | 35 | 45 | 41 | 62 | 46 | 0.55% |
| Total drivers drinking | 360 | 370 | 346 | 370 | 328 | 354 | 1.84% |
| Total drivers - excluding not stated | 990 | 916 | 923 | 944 | 830 | 903 | 9.60% |
| Total drivers | 1,036 | 951 | 968 | 985 | 892 | 949 | 9.17% |
| No. drinking drivers per 100 involved | 36.4 | 40.4 | 37.5 | 39.2 | 39.5 | 39.1 | -7.11% |
| No. drunk drivers per 100 involved | 29.9 | 33.4 | 31.6 | 32.5 | 31.3 | 32.2 | -7.21% |

Table 2-1a

SOBRIETY OF DRIVERS INVOLVED IN FATAL COLLISIONS
Rural Comparison

| Condition of Driver (Sobriety) | Years | | | | | Previous 4 Year Average | % of Change 87 - 4 Year Average |
|---|---|---|---|---|---|---|---|
| | 1987 | 1986 | 1985 | 1984 | 1983 | | |
| Had been drinking - ability impaired | 235 | 228 | 223 | 246 | 198 | 224 | 5.03% |
| Had been drinking - ability not impaired | 29 | 30 | 29 | 35 | 28 | 31 | -4.92% |
| Had been drinking - sobriety unknown | 14 | 7 | 6 | 6 | 24 | 11 | 30.23% |
| Had not been drinking | 460 | 377 | 433 | 422 | 360 | 398 | 15.58% |
| Not stated | 23 | 16 | 21 | 24 | 32 | 23 | -1.08% |
| Total drivers drinking | 278 | 265 | 258 | 287 | 250 | 265 | 4.91% |
| Total drivers - excluding not stated | 738 | 642 | 691 | 709 | 610 | 663 | 11.31% |
| Total drivers | 761 | 658 | 712 | 733 | 642 | 686 | 10.89% |
| No. drinking drivers per 100 involved | 37.7 | 41.3 | 37.3 | 40.5 | 41.0 | 40.0 | -5.87% |
| No. drunk drivers per 100 involved | 31.8 | 35.5 | 32.3 | 34.7 | 32.5 | 33.7 | -5.61% |

Table 2-1b

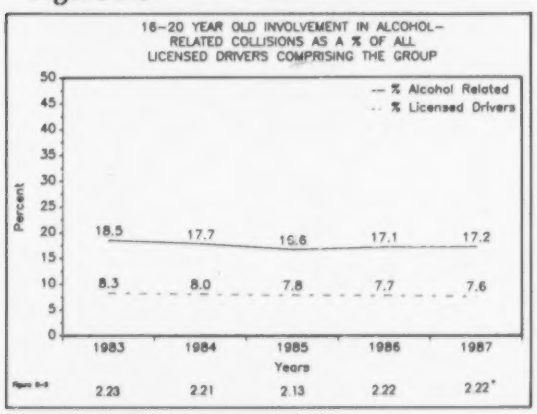
SOBRIETY OF DRIVERS INVOLVED IN FATAL COLLISIONS
Urban Comparison

| Condition of Driver (Sobriety) | Years | | | | | Previous 4 Year Average | % of Change 87 - 4 Year Average |
|---|---|---|---|---|---|---|---|
| | 1987 | 1986 | 1985 | 1984 | 1983 | | |
| Had been drinking - ability impaired | 61 | 78 | 69 | 61 | 62 | 68 | -9.63% |
| Had been drinking - ability not impaired | 11 | 21 | 14 | 17 | 9 | 15 | -27.87% |
| Had been drinking - sobriety unknown | 10 | 6 | 5 | 5 | 7 | 6 | 73.91% |
| Had not been drinking | 170 | 169 | 144 | 152 | 142 | 152 | 12.03% |
| Not stated | 23 | 19 | 24 | 17 | 30 | 23 | 2.22% |
| Total drivers drinking | 82 | 105 | 88 | 83 | 78 | 89 | -7.34% |
| Total drivers - excluding not stated | 252 | 274 | 232 | 235 | 220 | 240 | 4.89% |
| Total drivers | 275 | 293 | 256 | 252 | 250 | 263 | 4.66% |
| No. drinking drivers per 100 involved | 32.5 | 38.3 | 37.9 | 35.3 | 35.5 | 36.8 | -11.47% |
| No. drunk drivers per 100 involved | 24.2 | 28.5 | 29.7 | 26.0 | 28.2 | 28.1 | -13.82% |

## Alcohol Involvement By Age Group

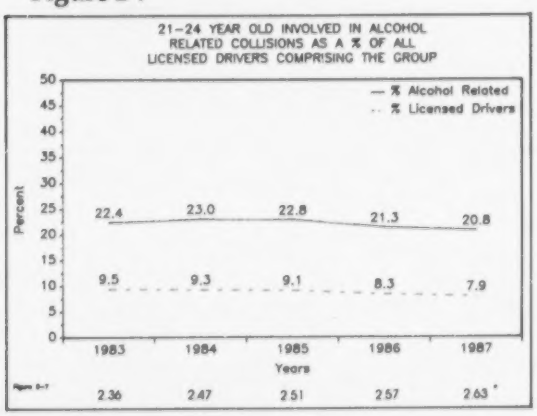
Drivers under 30 years of age continue to be over-represented in alcohol-related collision. The 16-20 year old group comprised 7.6% of all licensed drivers in the state in 1987 but were involved in 16.9% of all alcohol-related collisions. This was an over-representation ratio of 2.22, meaning this age group was involved in slightly more than two times more alcohol-related collisions than the percentage of licensed drivers it represented (Figure 2-6). The over-involvement ratio for drivers aged 21-24 in 1987 was 2.63. This age group's over-involvement ratio has climbed steadily since 1982 (Figure 2-7). In 1987 the 25-29 year age group was involved in 1.69 times more alcohol-related collisions than the percentage of licensed drivers the group represented (Figure 2-8). The age group 30-54 was under-represented by a ratio of .75 last year (Figure 2-9). The age group 55-64 was under-represented by a ratio of .30 last year (Figure 2-9a). The remaining age group 65 years and older was also under-represented by a ratio of .16 first year (Figure 2-9b).

**Figure 2-6**




* Ratio:
Under-involvement in alcohol-related collisions compared to % of licensed drivers in the population.

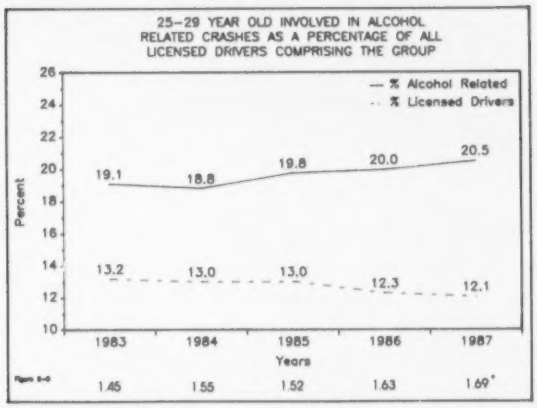
**Figure 2-7**




* Ratio:

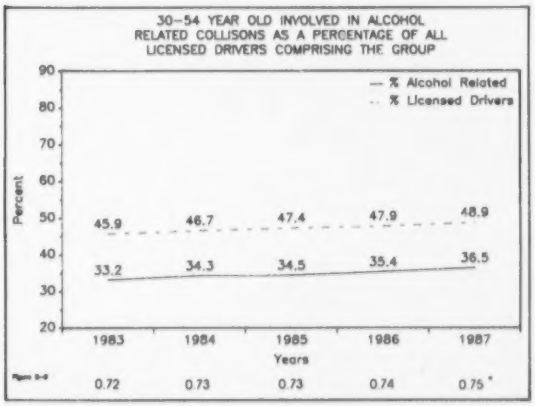
Over-involvement in alcohol-related collisions compared to % of licensed drivers in the population.

**Figure 2-8**



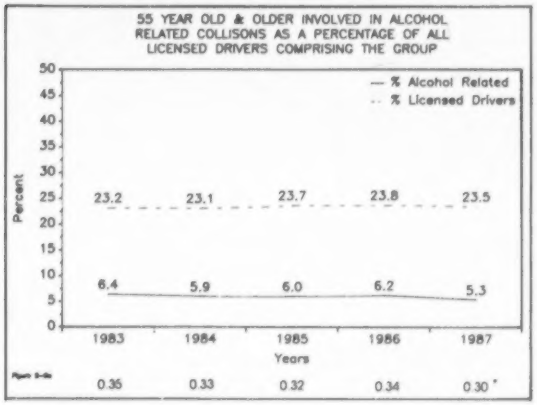

* Ratio:
Over-involvement in alcohol-related collisions compared to % of licensed drivers in the population.

**Figure 2-9**




* Ratio:
Under-involvement in alcohol-related collisions compared to % of licensed drivers in the population.

**Figure 2-9a**

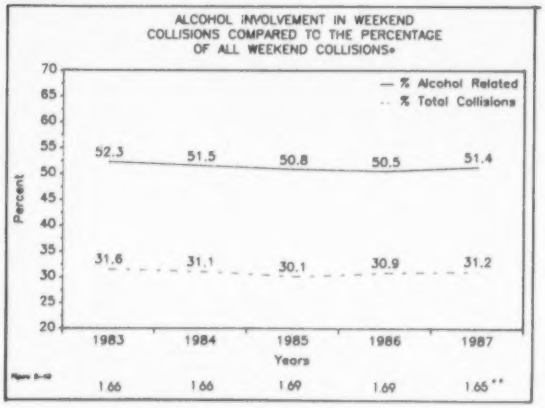



* Ratio:
Under-involvement in alcohol-related collisions compared to % of licensed drivers in the population.

## Weekend Alcohol Involvement

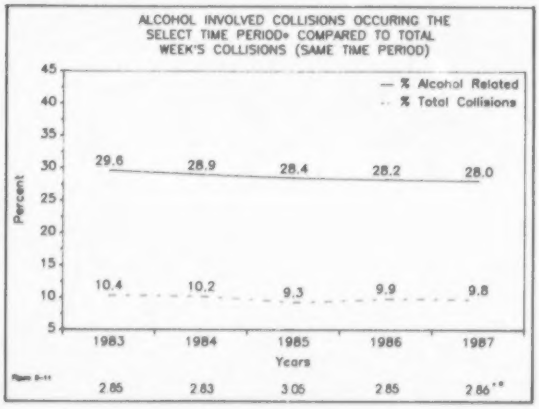
In 1987 the percentage of alcohol-related collisions occurred at a rate of 1.65 times greater than all weekend collisions (Friday 6 p.m. to Sunday midnight). This was down only slightly in the over-representation ratio registered for previous four years (Figure 2-10). In a further breakdown of weekend alcohol-related collisions comparing the percentage of alcohol-involved collisions occurring Friday and Saturday between the hours of 8 p.m. to 3 a.m. select time period to the percentage of the total week's collisions occurring in this time frame, the alcohol-related collisions are nearly 3 times over-represented. This over-representation is down slightly from in the over-representation ratio registered for the previous four years (Figure 2-11).

**Figure 2-10**




*Friday 6:00 p.m. through Sunday **Over-Involvement Ratio

**Figure 2-11**

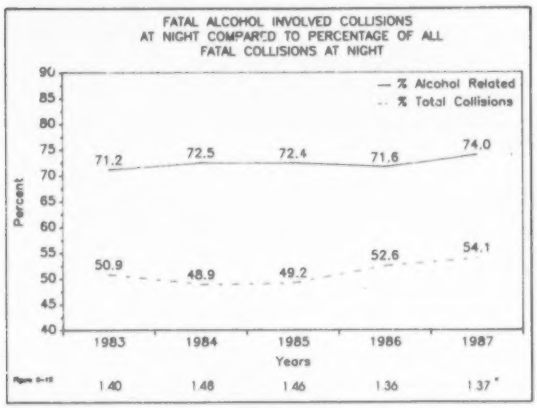



* Friday and Saturday 8:00 p.m. to 3:00 a.m. **Over-Involvement Ratio

## Fatal Alcohol Involved Collisions Occurring At Night

The number of all nighttime fatal collisions involving alcohol expressed as a percentage of all alcohol-related fatal collisions increased during 1987 compared to the previous year and the previous four years, as did the percentage of all nighttime fatal collisions. All nighttime fatal collisions in 1987 comprised 54.6% of the year's total fatal collisions while alcohol-related nighttime fatal collisions reach 74.0%. In 1986 alcohol-related fatal collisions at night were over-represented when compared to all nighttime fatal collisions by a ratio of 1.37, down from the previous four-year period ratios (Figure 2-12).

**Figure 2-12**




* Ratio:
Over-involvement ratio is % nighttime alcohol fatal collisions to % nighttime fatal collisions.

## Ratio of Drinking and Drunk Drivers Involved In Fatal Traffic Collisions

Over one-third (36.4%) of all drivers in fatal collisions in 1987 had been drinking prior to the collision. This is a substantial decrease from the previous year of 40.4% and the previous six year average of 41.8% (Figure 2-13). Twelve percent of the drivers involved in all investigated collisions had been drinking prior to the collision; down considerably from the 18.2 percent reported in 1981 (Figure 2-14).

**Figure 2-13**

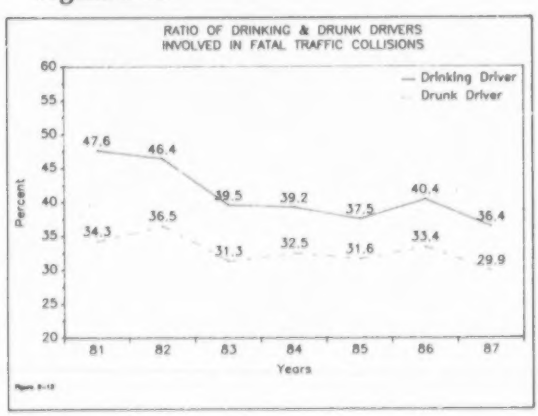
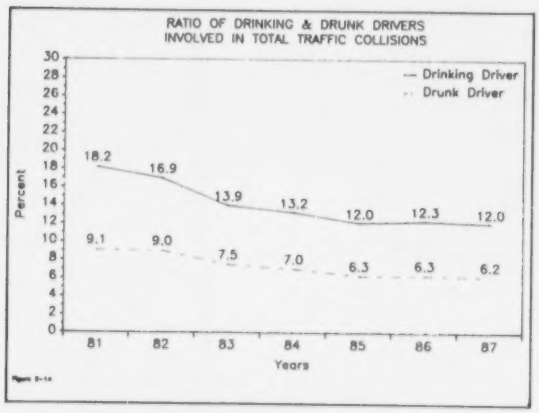


**Figure 2-14**




The total frequency of particular blood alcohol concentration (BAC) levels in fatal and serious injury collisions from 1983 through 1987 by age groups is presented in Table 2-2. The 16-20 and 21-24 age groups evidenced the greatest incidence of involvement for .05-.19 BAC levels. At the .16-.19 BAC range, the 21-24 age groups had the greatest frequency of occurrences. At the .20-.24 BAC levels, the 25-29 age groups had the greatest frequency of occurrences. At the 2.5 - .29 BAC levels, the 25-29 age group had the greatest frequency of occurrence followed closely by the 30-34 age group. Overall, the 16-20, 21-24, and 25-29 age groups display the highest incidence of involvement at all BAC levels.

Table 2-2

CHEMICAL TEST FOR INTOXICATION IN FATAL & SERIOUS INJURY COLLISIONS

| Age | Alcohol Level | | | | | | | Test Given No Results | Test Refused | Total Tested |
|---|---|---|---|---|---|---|---|---|---|---|
| | .00-.04 | .05-.09 | .10-.14 | .15-19 | .20-.24 | .25-.29 | .30 & Up | | | |
| 16-20 | 148 | 437 | 843 | 649 | 222 | 43 | 9 | 324 | 184 | 2,859 |
| 21-24 | 116 | 364 | 891 | 994 | 410 | 98 | 28 | 362 | 457 | 3,720 |
| 25-29 | 80 | 246 | 748 | 880 | 423 | 143 | 41 | 319 | 490 | 3,370 |
| 30-34 | 53 | 139 | 445 | 568 | 381 | 141 | 36 | 250 | 411 | 2,424 |
| 35-39 | 35 | 79 | 271 | 388 | 272 | 93 | 38 | 149 | 252 | 1,577 |
| 40-44 | 21 | 49 | 173 | 237 | 184 | 68 | 27 | 87 | 151 | 997 |
| 45-49 | 14 | 28 | 96 | 182 | 135 | 51 | 19 | 57 | 108 | 690 |
| 50-54 | 7 | 24 | 86 | 143 | 97 | 38 | 15 | 33 | 67 | 510 |
| 55-59 | 9 | 31 | 72 | 114 | 74 | 22 | 11 | 26 | 54 | 413 |
| 60-64 | 15 | 15 | 49 | 91 | 49 | 15 | 6 | 22 | 28 | 290 |
| 65-69 | 10 | 9 | 42 | 46 | 25 | 9 | 1 | 11 | 15 | 168 |
| Over 69 | 11 | 17 | 42 | 39 | 20 | 8 | 0 | 17 | 9 | 163 |
| TOTAL | 519 | 1,438 | 3,758 | 4,331 | 2,292 | 729 | 231 | 1,657 | 2,226 | 17,181 |

An analysis of roadway type by day of week on which alcohol-involved fatal and serious injury collisions occurred is given in Table 2-3. County roads accounted for 36.9% of the total weekly collisions compared to 27.5% for city streets. U.S. and state routes total 24.7% while the interstates and full-control access roads together contributed 9.9% of the weekly total of fatal and serious alcohol-involved collisions during 1987. The table also reveals that during this period of time, Saturday was the weekday with the greatest frequency of fatal and serious injury collisions involving alcohol. Sunday and Friday were the next highest days in that order.

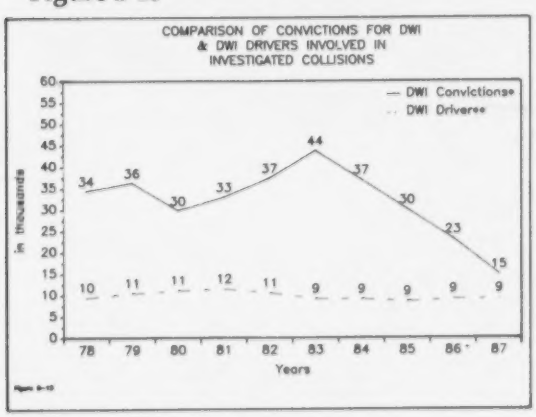
Table 2-3

FATAL & SERIOUS INJURY COLLISIONS INVOLVING ALCOHOL
Roadway Type by Day of Week

| Roadway Type | Day of Week | | | | | | | | % of Total Weekly Collisions | % of Previous 4 Year Average |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Total | | |
| County Roads | 250 | 224 | 226 | 283 | 402 | 634 | 481 | 2,500 | 36.9% | 34.2% |
| City Streets | 185 | 175 | 205 | 230 | 292 | 461 | 313 | 1,861 | 27.5% | 31.2% |
| U.S. & State Routes | 160 | 157 | 160 | 190 | 253 | 428 | 327 | 1,675 | 24.7% | 24.1% |
| Interstate & Full Control | 51 | 55 | 58 | 89 | 109 | 166 | 140 | 668 | 9.9% | 9.6% |
| Other Routes | 5 | 6 | 4 | 8 | 14 | 21 | 7 | 65 | 1.0% | 1.0% |
| Total | 651 | 617 | 653 | 800 | 1,070 | 1,710 | 1,268 | 6,769 | 100.0% | 100.0% |
| % of Total | 9.6% | 9.1% | 9.6% | 11.8% | 15.8% | 25.3% | 18.7% | 100.0% | | |
| % Previous 4 Year Average | 9.1% | 9.2% | 10.1% | 11.1% | 14.0% | 25.6% | 20.9% | 100.0% | | |

In 1987 the number of convictions for alcohol-related traffic offenses declined for the fourth consecutive year. The 14,938 convictions in 1987 for DWI/Physical Control violations represented a drop of 65.6% from the 43,835 convictions recorded for the year of 1983. In 1987 the number of DWI drivers involved in investigated collisions increased to 9,455 the highest number recorded since 1982 when 10,609 drivers were involved (Figure 2-15).

**Figure 2-15**




* Fiscal Year ** Calendar Year

Note: Convictions for physical control of vehicle while under the influence decreased from 10,520 in FY 1979 to 1,866 convictions in FY 1980. DWI convictions increased from 25,788 in FY 1979 to 27,942 in FY 1980.

Data for all collision involvement by driver's age and percent of vehicle miles traveled for each age group reveal that the 16-17 year olds have the greatest over-representation in all reported collisions at 5.23. The 18-20 year olds were the second most over-represented group. The age group with the greatest under-representation based on miles traveled was the 55-64 category. Those in the 16-17 year old bracket also displayed the greatest over-representation in alcohol-related collisions based on miles traveled. Second in this ranking was again the 18-20 year old group. The age group 55-65 recorded the greatest under-representation in alcohol-involved collisions with a 0.29 ratio (Table 2-4).

Table 2-4

ALL REPORTED ACCIDENTS & ALCOHOL INVOLVED ACCIDENTS
Comparison of Miles Traveled

| Driver Age | % of Vehicle Miles Traveled* | Drivers in All Accidents** | | Alcohol Involved Accidents | |
|---|---|---|---|---|---|
| | | % | Over/Under Ratio | % | Over/Under Ratio |
| 16-17 | 1.44 | 7.55% | 5.24% | 4.14% | 2.87% |
| 18-20 | 5.55 | 11.55% | 2.08% | 12.80% | 2.31% |
| 21-24 | 12.58 | 13.33% | 1.06% | 20.75% | 1.65% |
| 25-34 | 29.24 | 26.91% | 0.92% | 34.96% | 1.20% |
| 35-44 | 21.18 | 17.87% | 0.84% | 15.87% | 0.75% |
| 45-54 | 12.97 | 9.13% | 0.70% | 6.16% | 0.48% |
| 55-64 | 11.58 | 6.66% | 0.58% | 3.34% | 0.29% |
| 65 & Over | 5.34 | 7.00% | 1.31% | 1.99% | 0.37% |

* Source - Nationwide Personal Transportation Study - U.S. Dept. of Transportation, 1985
** Source - Accident Records Unit - Washington State Patrol

Table 2-5 presents a summary of the number of persons killed and injured, number of property damage collisions, and total investigated collisions for drivers under the influence, all drinking drivers, and non-drinking drivers. Most categories of non-drinking driver collisions showed increases over 1985. The exception is the number of persons receiving non-disabling injuries, this recorded a modest decrease. Drivers under the influence showed an increase in "Persons Receiving A Possible Injury." Total "DUI" Collisions recorded a 1.5% overall increase. Alcohol-related (Drivers Had Been Drinking) collisions showed a similar increase when compared to the previous year.

Table 2-5

SUMMARY OF PERSONS KILLED & INJURED IN ALCOHOL RELATED COLLISIONS
Two Year Comparison

| Status | Drivers Under the Influence | | | Drivers Who Had Been Drinking* | | | Non-Drinking Driver Collisions | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1987 | 1986 | % of Change | 1987 | 1986 | % of Change | 1987 | 1986 | % of Change |
| Persons Killed | 337 | 331 | 1.8% | 396 | 382 | 3.7% | 394 | 332 | 18.7% |
| Persons Injured | 7,970 | 7,823 | 1.9% | 13,555 | 13,517 | 0.3% | 45,584 | 45,278 | 0.7% |
| Disabling | 1,788 | 1,686 | 6.0% | 2,665 | 2,642 | 0.9% | 5,595 | 5,480 | 2.1% |
| Non-Disabling | 3,897 | 3,835 | 1.6% | 6,573 | 6,574 | 0.0% | 17,288 | 17,358 | -0.4% |
| Possible Injury | 2,285 | 2,302 | -0.7% | 4,301 | 4,301 | 0.0% | 22,717 | 22,440 | 1.2% |
| Property Damage Accidents | 4,040 | 3,921 | 3.0% | 8,496 | 8,205 | 3.5% | 50,078 | 48,089 | 4.1% |
| TOTAL ACCIDENTS*** | 9,398 | 9,256 | 1.5% | 17,590 | 17,305 | 1.6% | 81,676 | 79,226 | 3.1% |

*Including Drivers Under the Influence
**Less than 1/10th of one percent
***Investigated Accidents Only

Table 2-6 displays the number of persons killed and injured by drivers "under the influence" and "who had been drinking" by months for 1985, 1986, and 1987. The summer months typically show a higher incidence of persons killed and injured for both categories of alcohol-involved drivers.

Table 2-6

PERSONS KILLED & INJURED IN ALCOHOL RELATED COLLISIONS BY MONTH
Three Year Comparison

| Month | From Drivers "Under the Influence" | | | | | | From Drivers Who "Had Been Drinking" | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Persons Killed | | | Persons Injured | | | Persons Killed | | | Persons Injured | | |
| | 1987 | 1986 | 1985 | 1987 | 1986 | 1985 | 1987 | 1986 | 1985 | 1987 | 1986 | 1985 |
| January | 16 | 18 | 15 | 523 | 505 | 505 | 19 | 21 | 18 | 861 | 832 | 786 |
| February | 25 | 9 | 15 | 488 | 475 | 422 | 27 | 11 | 17 | 849 | 816 | 733 |
| March | 26 | 25 | 28 | 617 | 702 | 611 | 31 | 31 | 30 | 1,061 | 1,112 | 1,017 |
| April | 24 | 30 | 40 | 656 | 574 | 590 | 31 | 33 | 43 | 1,110 | 1,006 | 979 |
| May | 28 | 38 | 41 | 748 | 647 | 624 | 32 | 41 | 48 | 1,257 | 1,142 | 1,098 |
| June | 44 | 32 | 33 | 662 | 606 | 637 | 47 | 40 | 39 | 1,130 | 1,093 | 1,152 |
| July | 29 | 37 | 39 | 715 | 723 | 763 | 40 | 40 | 43 | 1,266 | 1,306 | 1,294 |
| August | 41 | 36 | 28 | 823 | 760 | 713 | 46 | 39 | 35 | 1,405 | 1,407 | 1,303 |
| September | 33 | 22 | 29 | 730 | 664 | 662 | 39 | 31 | 31 | 1,151 | 1,241 | 1,133 |
| October | 34 | 36 | 25 | 690 | 744 | 624 | 36 | 39 | 31 | 1,194 | 1,219 | 1,099 |
| November | 27 | 28 | 17 | 710 | 786 | 509 | 31 | 31 | 22 | 1,181 | 1,296 | 938 |
| December | 10 | 20 | 16 | 608 | 637 | 511 | 17 | 25 | 22 | 1,090 | 1,049 | 852 |
| TOTAL | 337 | 331 | 326 | 7,970 | 7,823 | 7,171 | 396 | 382 | 379 | 13,555 | 13,517 | 12,384 |

# Youth Involvement

## Overview

Drivers 20 years old and under comprised 7.4% of all licensed drivers in the state in 1987, yet this age group was involved in 19.4% of the total 1987 collisions. This was a collision over-representation rate 2.62 times higher than the percentage of licensed drivers comprising this group. The 21-24 age group was involved in 13.3% of the total collisions while comprising 8.0% of all licensed drivers, producing an over-representation factor of 1.66. The 25-29 year old group, comprising 14.4% of all licensed drivers, was involved in 12.1% for an over-representation of 1.19. All other age groups were under-represented when their percentages of collision involvement were compared to their percentages of to- tal licensed drivers (Table 3-1).

Table 3-1

COMPARISON OF DRIVERS INVOLVED TO NUMBER LICENSED
Driver Age Distribution

| Driver Age | Involved in Collisions | | % of Licensed Drivers | Over/Under Ratio |
|---|---|---|---|---|
| | Number | % of Total | | |
| Under 16 | 677 | 0.35% | 0.00% | 0.00 |
| 16 | 6,252 | 3.21% | 0.85% | 3.80 |
| 17-18 | 16,700 | 8.59% | 3.22% | 2.67 |
| 19-20 | 14,070 | 7.23% | 3.37% | 2.15 |
| 21-22 | 13,184 | 6.78% | 3.68% | 1.84 |
| 23-24 | 12,644 | 6.50% | 4.28% | 1.52 |
| 25-29 | 27,939 | 14.37% | 12.09% | 1.19 |
| 30-34 | 24,214 | 12.45% | 12.95% | 0.96 |
| 35-39 | 19,851 | 10.21% | 12.20% | 0.84 |
| 40-44 | 14,774 | 7.60% | 10.29% | 0.74 |
| 45-49 | 9,917 | 5.10% | 7.55% | 0.68 |
| 50-54 | 7,768 | 3.99% | 5.98% | 0.67 |
| 55-59 | 6,917 | 3.56% | 5.57% | 0.64 |
| 60-64 | 5,992 | 3.08% | 5.43% | 0.57 |
| 65-69 | 4,966 | 2.55% | 4.96% | 0.51 |
| 70 & Over | 8,607 | 4.43% | 7.57% | 0.58 |

## Youthful Drivers Involvement In Collisions By First Harmful Event

In 1987, 73.9% of those drivers age 24 years and younger who were involved in all collisions collided with other moving vehicles. This type of collision also

resulted in the greatest percentage of fatal collisions (45.2%) and injury collisions (69.5%). Single vehicle collisions with fixed objects led to the second largest percentage of youthful driver involvement in total, fatal and injury collisions, at 15.7%, 27.2% and 17.2% respectfully (Table 3-2).

Table 3-2

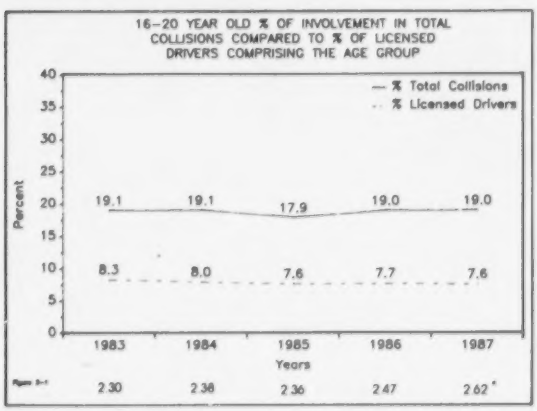
YOUTHFUL DRIVER INVOLVEMENT IN COLLISIONS
By First Harmful Event

| Type of Collision | Total Collisions | | Fatal Collisions | | Injury Collisions | |
|---|---|---|---|---|---|---|
| | Number | % of Total | Number | % of Total | Number | % of Total |
| Collision with other moving motor vehicles | 40,719 | 73.9% | 131 | 45.2% | 15,383 | 69.5% |
| Collision with parked vehicle | 1,963 | 3.6% | 5 | 1.7% | 484 | 2.2% |
| Collision with fixed/other object | 8,655 | 15.7% | 79 | 27.2% | 3,809 | 17.2% |
| Overturning & other non collision | 2,622 | 4.8% | 39 | 13.4% | 1,601 | 7.2% |
| Collisions with pedestrians & pedalcyclists | 804 | 1.5% | 32 | 11.0% | 760 | 3.4% |
| Other collisions - animal & R.R. train | 315 | 0.6% | 4 | 1.4% | 81 | 0.4% |
| TOTAL | 55,078 | 100.0% | 290 | 100.0% | 22,118 | 100.0% |

## Youthful Collision Involvement By Age Group

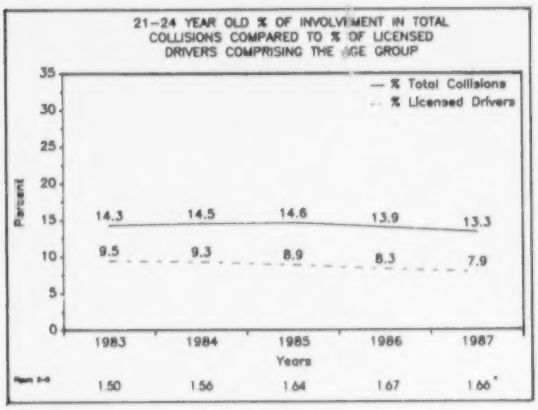
In 1987 the 16-20 year old age group was involved in 19.4% of all collisions. This group's over-representation ratio of 2.62 was up from the 2.47 ratio for 1986. It is also the highest over-representation ratio for any age group (Figure 3-1). The 21-24 year old age group decreased its over-representation ratio slightly from 1.67 to 1.66 (Figure 3-2). The 25-29 age group posted an over-representation ratio of 1.19, down from the previous year's 1.20 (Figure 3-3). The 30-54 age group continued to be under-represented in total collisions compared to this group's percentage of all licensed drivers, as are the 55 year old and older age group (Figure 3-4 & 3-4a).

**Figure 3-1**



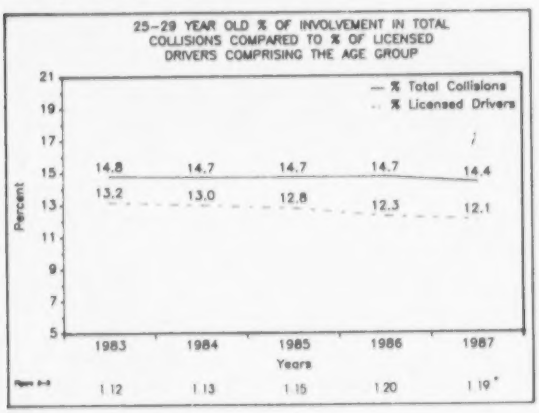

Ratio:
Over-representation ratio

**Figure 3-2**



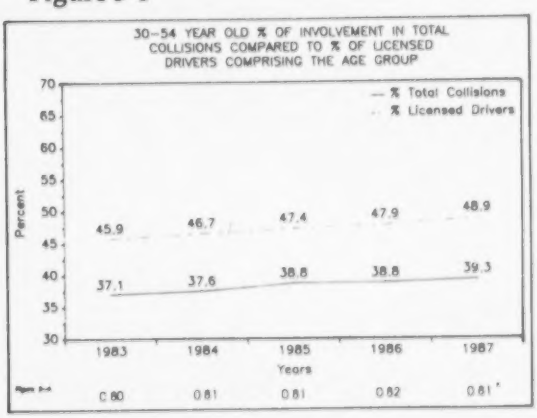

Ratio:
Over-representation ratio

**Figure 3-3**



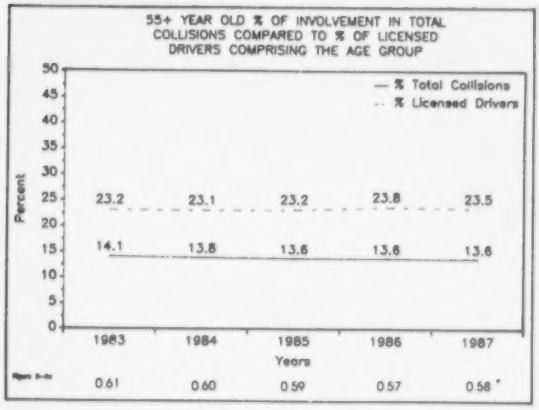

Ratio:
Over-representation ratio

**Figure 3-4**



Ratio:
Over-representation ratio

**Figure 3-4a**




Ratio:
Over-representation ratio

## Collision Severity By Area For Youthful Drivers

In 1987, the urban area collisions decreased a percentage point in the urban and rural mix of collisions involving youthful drivers (24 years old and younger). The urban areas recorded 58.0% of the total and the rural areas contributing to 42.0% (Figure 3-5). In 1987, youthful driver injury collisions also decreased in the urban area recording 53.6% urban and 46.4% rural (Figure 3-6). Youthful driver fatal collisions continued to be far more common in rural areas. In 1987, 77.9% of the fatal collisions involving youthful drivers occurred in rural areas, an increase of nearly 9 percentage points over 1986 and 4 percentage points over 1985. The urban area recorded 22.1% of the fatal crashes in 1987, down from the 31% of the year earlier (Figure 3-7).

**Figure 3-5**

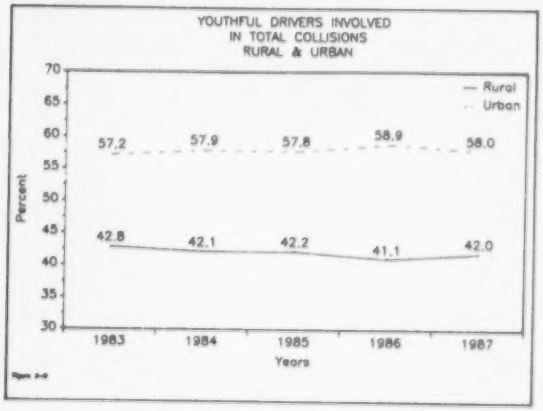


**Figure 3-6**

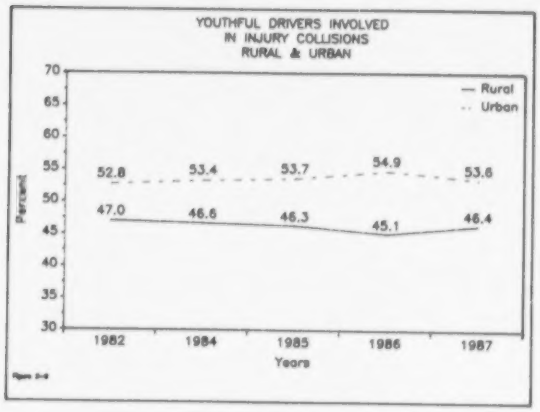
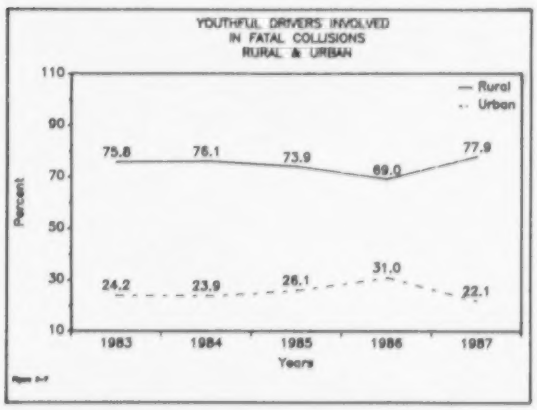



**Figure 3-7**




## Youthful Driver Involvement By Time

In 1987, 20.4% of all the rural fatal collisions and 18.3% of all reported collisions involving youthful drivers occurred on Saturday (Figure 3-8). In urban areas, Saturday also had the highest occurrence of fatal collisions involving youthful drivers (25.0%), but Friday recorded the greatest percentage of total collisions (18.7%) for the group (Figure 3-9).

**Figure 3-8**

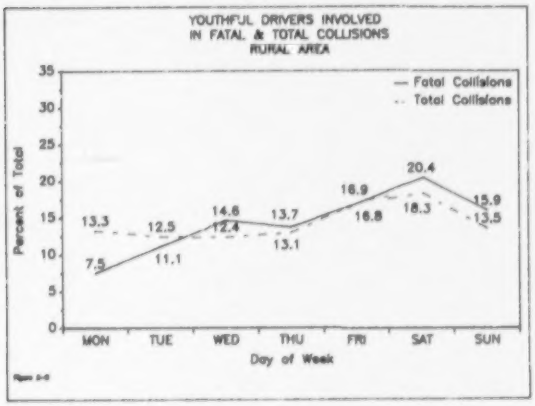
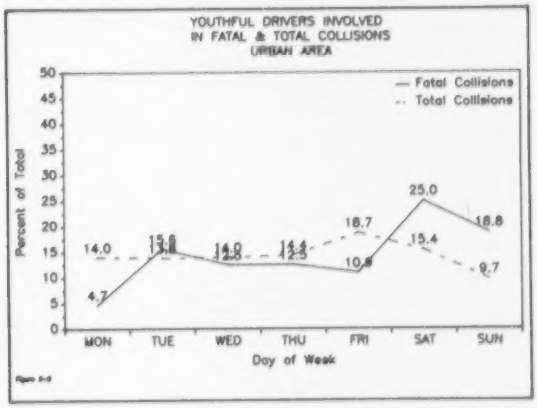



**Figure 3-9**




In rural areas, the greatest percentage (18.62) of youthful driver involvement in fatal collisions in 1987 occurred from 6:00 p.m. to 9:00 p.m.. The greatest percentage of total collision involvement (23.5%) for these drivers was from 3 p.m. to 6 p.m. (Figure 3-10). In the urban areas, the greatest youthful involvement by time period in fatal collisions was 20.3% in the 9:00 p.m. to midnight. The 3 p.m. to 6 p.m. time period recorded 26.3% of the youthful drivers involved in total urban collisions (Figure 3-11).

**Figure 3-10**

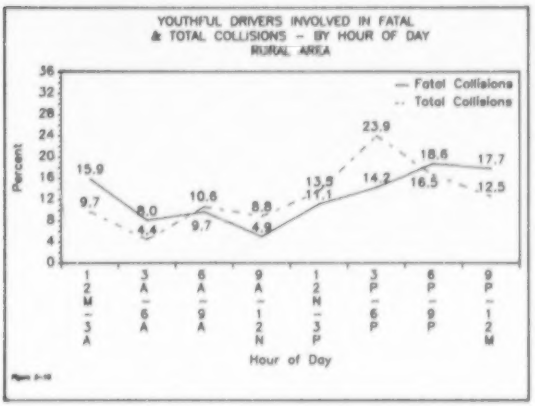
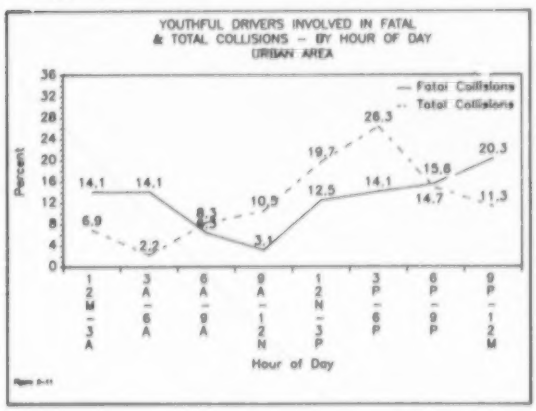



**Figure 3-11**



# Safety Restraint Usage

## Overview

In 1987, out of a total of 196,494 occupants involved in total investigated collisions, 152,413 were using safety restraints. This is a usage rate of 77.6% and marks the fifth consecutive year of increases in safety restraint usage since 1981 (Table 4-1).

Table 4-1

RESTRAINT USAGE RATE
Five Year Comparison

| Status | 1987 | % | 1986 | % | 1985 | % | 1984 | % | 1983 | % |
|---|---|---|---|---|---|---|---|---|---|---|
| Restraints Used | 152,413 | 77.6% | 102,751 | 54.5% | 60,392 | 35.1% | 45,214 | 28.0% | 31,751 | 21.0% |
| No Restraints Used | 44,081 | 22.4% | 85,669 | 45.5% | 111,885 | 64.9% | 116,299 | 72.0% | 119,670 | 79.0% |
| TOTAL | 196,494 | 100.0% | 188,420 | 100.0% | 172,277 | 100.0% | 161,513 | 100.0% | 151,421 | 100.0% |

In 1987, 152,413 persons out of a total 196,494 collision-involved occupants were using a restraining device. Child restraints were used by 2,503 collision-involved children (Table 4-2). Looking at all restraining devices by usage and non-usage categories, it appears that with the safety restraint usage, injuries were less likely to occur and those that did occur were less severe (Appendix C).

Table 4-2

RESTRAINT USAGE & INJURIES SUSTAINED*
By Type

| | Restraints Used | | Child Restraints** | | No Restraints | | Total Occupants | |
|---|---|---|---|---|---|---|---|---|
| Type | Number | % | Number | % | Number | % | Number | % |
| Deaths | 140 | 0.1% | 5 | 0.2% | 398 | 0.9% | 538 | 0.3% |
| Disabling Injuries | 2,544 | 1.6% | 8 | 0.3% | 2,921 | 6.6% | 5,465 | 2.7% |
| Evident Injuries | 10,896 | 7.0% | 116 | 4.6% | 7,613 | 17.3% | 18,509 | 9.3% |
| Possible Injuries | 21,602 | 13.8% | 146 | 5.8% | 5,411 | 12.3% | 27,013 | 13.5% |
| No Injuries | 120,817 | 77.4% | 2,228 | 89.0% | 27,728 | 62.9% | 148,545 | 74.2% |
| TOTAL | 155,999 | 100.0% | 2,503 | 100.0% | 44,071 | 100.0% | 200,070 | 100.0% |

*Excludes cases where injury severity was not stated or where restraint use was unknown.
**Included with Restraints Used Category.

In 1987, 83.3% of the female drivers used their restraints while 77.8% of the male drivers used their restraints in collisions. Female passengers had a usage rate of 75.9% compared to 75.9% for male passengers. The 0-5 age group had the highest restraint usage of any age group at 85.6%. The age group with the lowest usage rate was the 16-19 year olds at 71.6% usage (Table 4-3 and 4-3a).

Table 4-3

USAGE RATES BY SEX*
Five Year Comparison

| Occupant | Percent Used Restraints | | | | |
|---|---|---|---|---|---|
| | 1987 | 1986 | 1985 | 1984 | 1983 |
| Male Driver | 77.8 | 54.0 | 34.3 | 27.3 | 22.0 |
| Female Driver | 83.3 | 59.6 | 38.8 | 31.4 | 23.6 |
| Male Passenger | 69.0 | 46.7 | 29.4 | 26.4 | 14.8 |
| Female Passenger | 75.9 | 55.0 | 36.0 | 28.4 | 18.9 |

*Excludes occupants where restraint use was unknown

Table 4-3a

USAGE RATES BY AGE*
Five Year Comparison

| Occupant | Percent Used Restraints | | | | |
|---|---|---|---|---|---|
| | 1987 | 1986 | 1985 | 1984 | 1983 |
| Age 0-5 | 85.6 | 81.0 | 73.1 | 66.8 | 42.3 |
| Age 6-15 | 72.5 | 51.5 | 31.3 | 24.9 | 14.8 |
| Age 16-19 | 71.6 | 44.2 | 27.0 | 20.8 | 15.2 |
| Age 20-24 | 80.4 | 47.5 | 28.5 | 22.0 | 16.3 |
| Age 25-34 | 77.4 | 47.5 | 36.6 | 29.5 | 23.0 |
| Age 35-64 | 82.9 | 55.3 | 39.7 | 32.0 | 23.3 |
| Age 65 & Up | 82.6 | 60.6 | 34.7 | 27.6 | 21.4 |

*Excludes occupants where restraint use was unknown

Examination of restraint usage by occupant age for 1987 reveals that the 1 year old and younger age group had the highest usage rate at 90.1%. The lowest rate of restraint usage (64.7%) was for 15 year old occupants. Teenage occupants recorded the lowest usage rate of any group with 69.8% (Table 4-4).

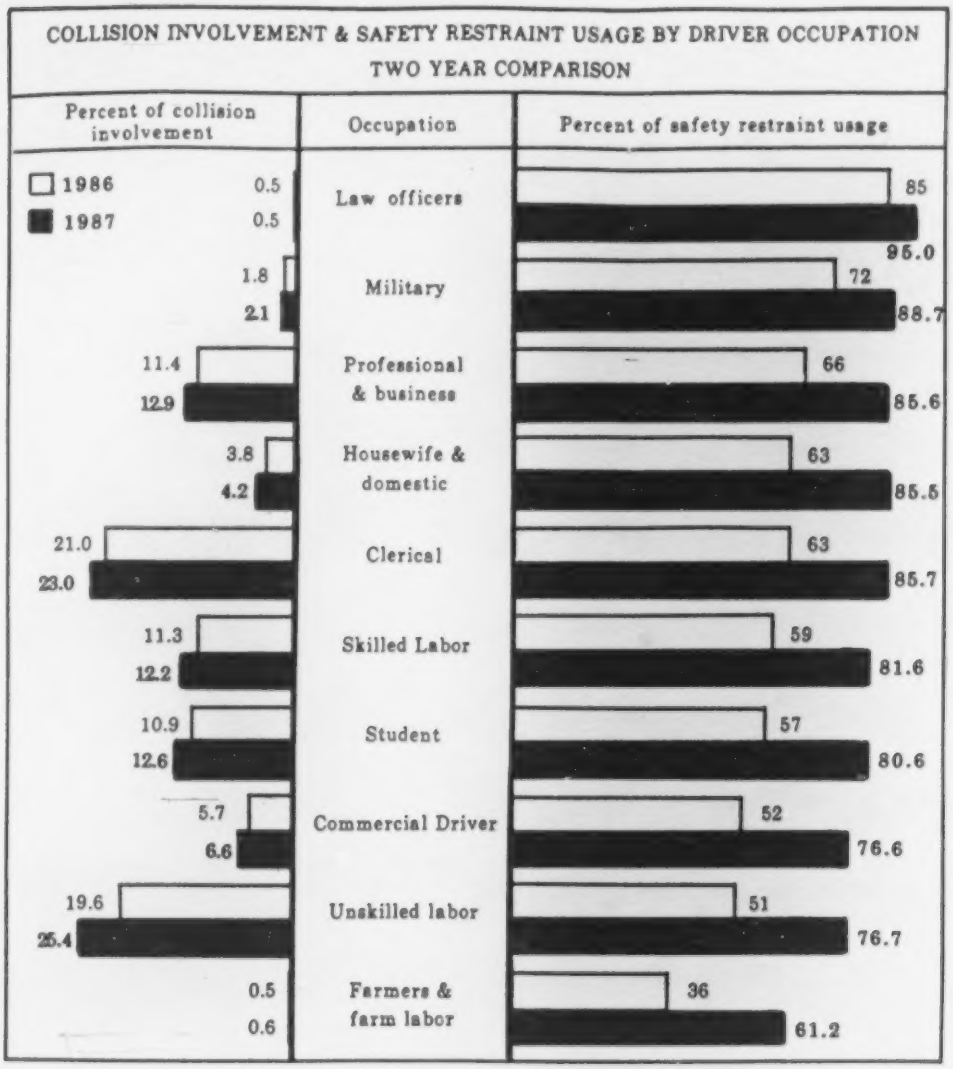
Table 4-4

SEAT BELT USAGE
By Occupant Age

| Age | Seat Belt Type | | | | | Total Restraints Used | | Restraints Not Used | |
|---|---|---|---|---|---|---|---|---|---|
| | Lap Belt | Shoulder Belt | Lap & Shoulder Belt | Child Restraint | Air Bag Activated | Number | % of Total | Number | % of Total |
| Under 1 | 31 | 2 | 59 | 446 | 0 | 538 | 86.1% | 87 | 13.9% |
| 1 | 107 | 9 | 114 | 745 | 2 | 977 | 90.1% | 107 | 9.9% |
| 2 | 328 | 7 | 228 | 537 | 0 | 1,100 | 85.6% | 185 | 14.4% |
| 3 | 446 | 17 | 338 | 294 | 0 | 1,095 | 86.4% | 173 | 13.6% |
| 4 | 461 | 22 | 380 | 123 | 1 | 987 | 84.2% | 185 | 15.8% |
| 5 | 513 | 12 | 374 | 61 | 0 | 960 | 81.9% | 212 | 18.1% |
| 6 | 447 | 20 | 356 | 18 | 0 | 841 | 81.7% | 189 | 18.3% |
| 7 | 385 | 18 | 310 | 7 | 0 | 720 | 78.3% | 200 | 21.7% |
| 8 | 344 | 20 | 267 | 3 | 0 | 634 | 77.8% | 181 | 22.2% |
| 9 | 307 | 9 | 266 | 1 | 0 | 583 | 76.0% | 184 | 24.0% |
| 10 | 307 | 18 | 295 | 1 | 0 | 621 | 79.1% | 164 | 20.9% |
| 11 | 241 | 19 | 236 | 2 | 0 | 498 | 72.8% | 186 | 27.2% |
| 12 | 266 | 20 | 294 | 0 | 0 | 580 | 76.0% | 183 | 24.0% |
| 13 | 262 | 18 | 345 | 0 | 0 | 625 | 71.0% | 255 | 29.0% |
| 14 | 335 | 37 | 446 | 0 | 1 | 819 | 66.4% | 415 | 33.6% |
| 15 | 602 | 66 | 976 | 0 | 0 | 1,644 | 64.7% | 896 | 35.3% |
| 16 | 1,502 | 252 | 4,071 | 0 | 1 | 5,826 | 73.4% | 2,115 | 26.6% |
| 17 | 1,738 | 330 | 4,686 | 0 | 0 | 6,754 | 71.9% | 2,644 | 28.1% |
| 18 | 1,656 | 278 | 4,237 | 0 | 2 | 6,173 | 70.4% | 2,598 | 29.6% |
| 19 | 1,319 | 242 | 3,823 | 0 | 0 | 5,384 | 70.7% | 2,232 | 29.3% |
| 20 | 1,095 | 215 | 3,389 | 0 | 0 | 4,699 | 71.1% | 1,908 | 28.9% |
| 21 - 24 | 3,801 | 713 | 13,196 | 0 | 1 | 17,711 | 73.0% | 6,562 | 27.0% |
| 25 - 29 | 3,923 | 718 | 13,734 | 0 | 4 | 18,379 | 75.7% | 5,901 | 24.3% |
| 30 - 64 | 11,264 | 2,450 | 46,013 | 0 | 9 | 59,736 | 81.8% | 13,322 | 18.2% |
| 65 & Over | 2,067 | 479 | 7,821 | 0 | 5 | 10,372 | 85.5% | 1,758 | 14.5% |
| Age Unknown | 594 | 138 | 1,756 | 239 | 1 | 2,728 | 73.0% | 1,010 | 27.0% |
| TOTAL | 34,341 | 6,129 | 108,010 | 2,477 | 27 | 150,984 | 77.5% | 43,852 | 22.5% |

The usage rate of safety restraints by occupation of driver ranges from a high of 95.3% for law officers to a low of 61.2% for farmers and/or farm labor. Usage rates for all occupations showed substantial increases in 1987 over the rates for the preceding year (Figure 4-1).

**Figure 4-1**




Freeway travel (interstates) and other controlled access routes had the highest usage rate by vehicle occupants at 84.6%. Occupants of vehicles traveling on county roads had one of the lowest recorded usage rate at 72.5%. All other roadways, which include forest service roads and recreational roads which are open to public, recorded a 63.6% usage rate. (Table 4-5).

Table 4-5

RESTRAINT USAGE
By Functional Class of Roadway

| Functional Class | 1987 | 1986 | 1985 | 1984 | 1983 |
|---|---|---|---|---|---|
| Interstate & limited | 84.6% | 66.8% | 49.6% | 41.0% | 27.4% |
| Other state routes | 82.0% | 56.0% | 34.9% | 28.9% | 21.1% |
| County Roads | 72.5% | 50.5% | 31.6% | 24.3% | 17.7% |
| City Streets | 77.9% | 52.6% | 32.1% | 26.4% | 20.1% |
| All others | 63.6% | 41.8% | 29.7% | 24.8% | 19.8% |

Examination of safety restraint usage by vehicle type reveals substantial increases in usage rates for all types of vehicles. The lowest usage rate (67.7%) in 1987 was recorded for those in heavy trucks (Table 4-6).

Table 4-6

RESTRAINT USAGE RATE BY TYPE OF VEHICLE DRIVERS
Five Year Comparison

| Type of Vehicle | 1987 | 1986 | 1985 | 1984 | 1983 |
|---|---|---|---|---|---|
| Passenger car | 78.9% | 56.6% | 36.8% | 29.8% | 22.4% |
| Light Trucks | 73.1% | 48.8% | 29.8% | 22.2% | 16.2% |
| Heavy Trucks | 67.7% | 49.9% | 27.3% | 20.1% | 16.0% |
| All others | 69.5% | 52.9% | 34.6% | 30.9% | 21.5% |

In 1987, 93.8% of the occupants were using safety restrains in "state government registered vehicles" involved in collisions. This is up 22.9% from the preceding year. The next highest usage rate was the 87.6% reported for "other government (federal agency) registered vehicles." Occupants of county registered vehicles had the lowest usage rate of occupants in all government owned vehicles recording at 78.2%. (Table 4-7).

Table 4-7

RESTRAINT USAGE RATE BY TYPE OF GOVERNMENT VEHICLES
Five Year Comparison

| Type of Government Vehicle | 1987 | 1986 | 1985 | 1984 | 1983 |
|---|---|---|---|---|---|
| State registered vehicles | 93.8% | 76.3% | 77.4% | 68.3% | 60.0% |
| County registered vehicles | 78.2% | 63.8% | 49.5% | 43.6% | 32.3% |
| Municipal registered vehicles | 85.9% | 66.3% | 49.9% | 41.4% | 35.1% |
| Other government registered vehicles | 87.6% | 84.1% | 68.3% | 58.6% | 54.2% |

Drivers residing in other states recorded the lowest seat belt usage rate in 1987. 79.1% of the instate drivers residing over 15 miles of the collision scene recorded the highest usage rate of 80.4%. All categories continued to record increases in restraint usage rates over previous years (Table 4-8).

Table 4-8

RESTRAINT USAGE RATE BY PROXIMITY OF DRIVER RESIDENCE
Five Year Comparison

| Residence Proximity | 1987 | 1986 | 1985 | 1984 | 1983 |
|---|---|---|---|---|---|
| Resided within 15 miles of collision | 79.7% | 55.5% | 35.3% | 28.2% | 22.1% |
| Resided over 15 miles | 80.4% | 58.1% | 38.9% | 31.1% | 23.7% |
| Residing in other state | 79.1% | 60.0% | 41.3% | 35.1% | 28.6% |

An examination of restraint usage by seat position in 1987 reveals that drivers were the most frequent users at 79.7%. Occupants in the right front and left back positions were the next two most frequent restraint users at 74.9% each. These

Table 4-9

RESTRAINT USAGE RATE BY OCCUPANT SEAT POSITION
Five Year Comparison

| Occupants | 1987 | 1986 | 1985 | 1984 | 1983 |
|---|---|---|---|---|---|
| Driver | 79.7% | 55.9% | 35.8% | 28.6% | 22.5% |
| Mid-front | 51.8% | 34.0% | 21.2% | 17.1% | 10.6% |
| Right-front | 74.9% | 51.9% | 31.9% | 24.6% | 17.0% |
| Left-back | 74.9% | 58.1% | 42.6% | 36.5% | 22.2% |
| Mid-back | 62.4% | 44.4% | 33.3% | 25.7% | 14.9% |
| Right-back | 74.1% | 58.0% | 40.8% | 34.6% | 21.9% |
| Other | 28.8% | 21.5% | 20.3% | 13.0% | 4.8% |
| TOTAL | 77.6% | 54.5% | 35.1% | 27.9% | 21.0% |

positions include the greatest usage of child restraints. Seat position occupants showing the least usage of restraints were those riding in the mid-front, were 51.8% were reported using restraints (Table 4-9).

Table 4-10 presents 1987 restraint usage by occupant age and seat position. The right-back and left-back for the 0-4 age group had the highest reported usage at 92.2% and 92.1%, respectively. For the 5-9 age group, the most frequent safety restraint usage also occurred in the right-back (85.8%) and left-back (84.9%) seat positions. The positions with the lowest reported usage rates for the 25-29 age group were the mid-back seats--18.2%. The mid-back restraints were the lesser used in the 21-24 age group. The driver continued to "buckle up" more than any other occupant for those aged 15 through 64. The right-front occupant was the most frequent restraint user at 86.6% in the 65 and over age category.

Table 4-10

RESTRAINT USAGE RATE
By Occupant Age & Seat Position

| Seat Position | Age | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0-4 | 5-9 | 10-14 | 15-20 | 21-24 | 25-29 | 30-64 | 65 & Over |
| Driver | - | - | 48.0% | 75.2% | 75.6% | 77.8% | 82.7% | 85.6% |
| Mid-front | 75.5% | 61.4% | 49.1% | 38.8% | 40.0% | 44.3% | 52.2% | 71.9% |
| Right-front | 85.3% | 81.7% | 78.5% | 69.1% | 68.7% | 71.0% | 79.8% | 86.6% |
| Left-back | 92.1% | 84.9% | 73.3% | 60.4% | 59.9% | 58.3% | 67.4% | 59.1% |
| Mid-back | 86.6% | 73.8% | 61.5% | 42.2% | 28.6% | 18.8% | 50.3% | 65.4% |
| Right-back | 92.2% | 85.8% | 34.0% | 62.9% | 62.5% | 70.0% | 71.4% | 29.8% |
| Other | 54.5% | 43.1% | 33.7% | 18.6% | 15.2% | 18.2% | 14.6% | 25.0% |
| Seat location unknown | 58.6% | 65.8% | 60.4% | 41.9% | 26.9% | 27.7% | 43.0% | 71.4% |

A more detailed breakdown of types of restraints used by injury severity is presented for 1987 in Table 4-11. Of 538 occupants killed in vehicle collisions, 398 (74.0%) were not using restraints. Of the 5,465 persons sustaining disabling injuries by collisions, 53.4% were using no restraints. 57.9% of the occupants which were restrained with the combination lap/shoulder belts received no injuries as reported in investigated collisions, up from the 38.6% reported for 1986.

Table 4-11

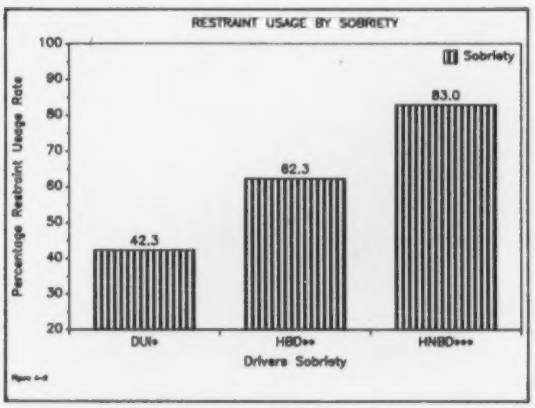
TYPES OF RESTRAINTS USED
By Severity of Injury

| Type | Number Used | | Deaths | | Disabling Inj | | Evident Inj | | Possible Inj | | No Injury | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | % | Number | % | Number | % | Number | % | Number | % | Number | % |
| Lap Belt | 38,212 | 19.1% | 32 | 5.9% | 574 | 10.5% | 2,736 | 14.8% | 7,318 | 27.1% | 27,552 | 18.5% |
| Shoulder Belt | 6,175 | 3.1% | 4 | 0.7% | 117 | 2.1% | 403 | 2.2% | 660 | 2.4% | 4,991 | 3.4% |
| Lap & Shoulder Belt | 109,082 | 54.5% | 99 | 18.4% | 1,845 | 33.8% | 7,638 | 41.3% | 13,475 | 49.9% | 86,025 | 57.9% |
| Child Restraint | 2,503 | 1.3% | 5 | 0.9% | 8 | 0.1% | 116 | 0.6% | 146 | 0.5% | 2,228 | 1.5% |
| Air Bag (Activated) | 27 | 0.0% | 0 | 0.0% | 0 | 0.0% | 3 | 0.0% | 3 | 0.0% | 21 | 0.0% |
| No Restraints | 44,071 | 22.0% | 398 | 74.0% | 2,921 | 53.4% | 7,613 | 41.1% | 5,411 | 20.0% | 27,728 | 18.7% |
| TOTAL OCCUPANTS | 200,070 | 100.0% | 538 | 100.0% | 5,465 | 100.0% | 18,509 | 100.0% | 27,013 | 100.0% | 148,545 | 100.0% |

*Less than 1/10 of 1 percent

Of all collision-involved drivers in 1987, those who had been drinking displayed a greater tendency not to use restraints than those drivers who had not been drinking. The latter category revealed a restraint-usage rate of 83.0% compared to a usage rate of 42.3% for drivers under the influence and 62.3% for drivers who had been drinking but were not under the influence (Figure 4-2).

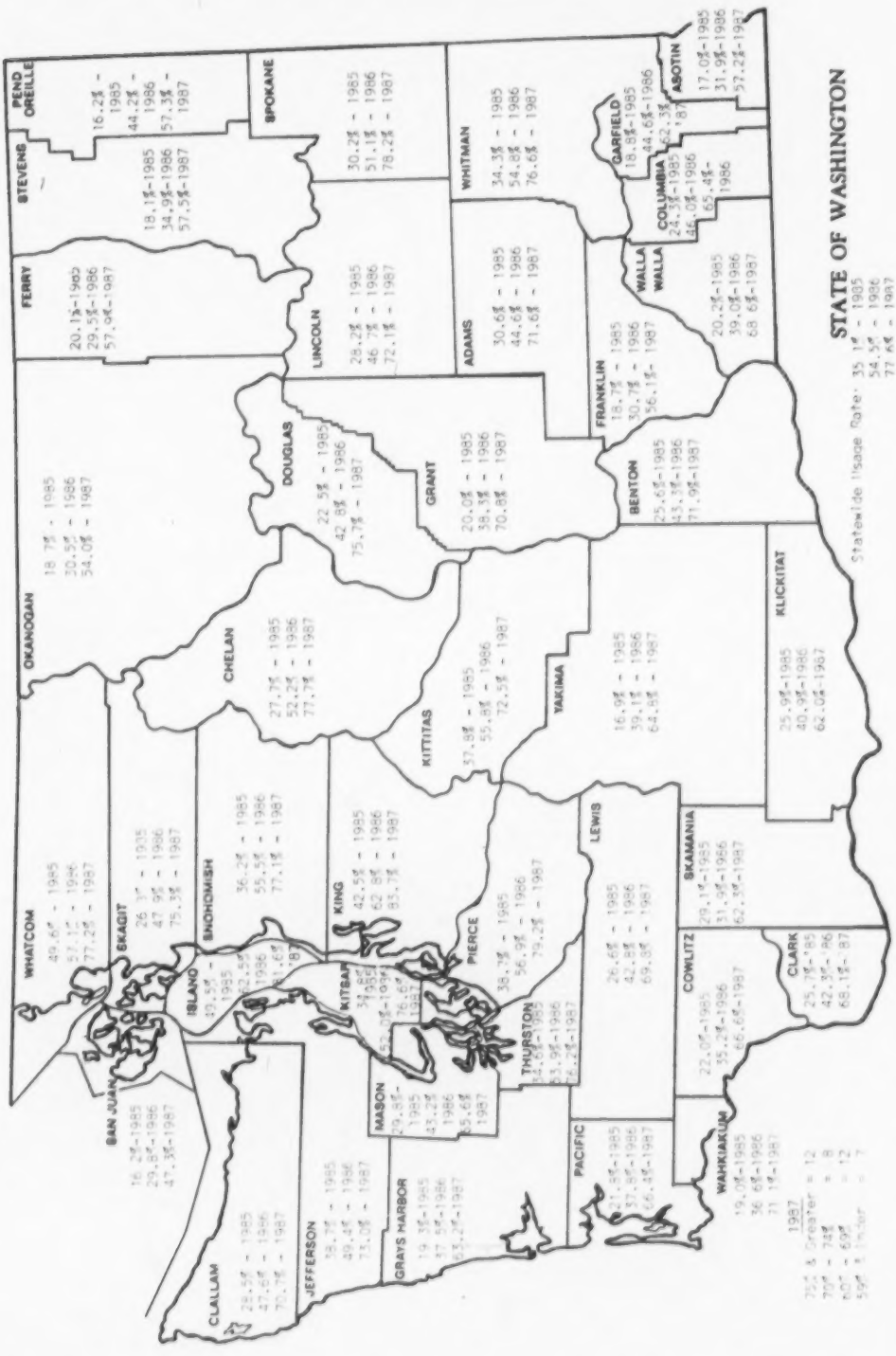
**Figure 4-2**




A graphic depiction of restraint use by county is presented in Figure 4-3. King County, at 83.7%, had the highest usage rate of all counties in the state in 1987. Island County had the next highest usage rate at 81.6%. The two counties with the lowest usage rate was San Juan County recording a usage rate of 47.3% and Okanogan County at 54.0%.

**Figure 4-3**

**Occupant Restraint Usage Rate by County, 1985-87**



# Motorcycle Collisions

## Overview

The 1987 motorcycle fatal collisions increased 14.3%, when compared to the previous 4-year baseline average. Total reported collisions, however, recorded a 3.4% decrease and injury collisions recorded a 5.7% decrease over the baseline average. Registration in 1987 totaled 124,215 motorcycles, a decrease of 1.2% over the baseline period. The motorcycle collision rate of 2.72 for 1987 was down 2.4% over the baseline rate of 2.72 motorcycle collisions per every 100 registered (Table 5-1).

Table 5-1

MOTORCYCLE COLLISIONS SUMMARY
Five Year Comparison

| Collision Severity/Exposure & Rates | Years | | | | | Previous 4 Year Average | % of Change 87 - 4 Year Average |
|---|---|---|---|---|---|---|---|
| | 1987 | 1986 | 1985 | 1984 | 1983 | | |
| Total Collisions | 3,379 | 3,508 | 3,699 | 3,477 | 3,312 | 3,499 | -3.43% |
| Fatal Collisions | 88 | 80 | 82 | 69 | 77 | 77 | 14.29% |
| Injury Collisions | 2,816 | 3,003 | 3,139 | 2,965 | 2,839 | 2,987 | -5.71% |
| Motorcycle Registration | 124,215 | 122,751 | 125,224 | 126,703 | 127,950 | 125,657 | -1.15% |
| Fatal Collision Ratio* | 26.0 | 22.8 | 22.2 | 19.8 | 23.2 | 22.0 | 18.29% |
| Fatal Registration Rate** | 0.708 | 0.652 | 0.655 | 0.545 | 0.602 | 0.613 | 15.53% |
| Total Collision Registration Rate*** | 2.72 | 2.86 | 2.95 | 2.74 | 2.59 | 2.79 | -2.36% |

* Fatal Collisions per 1,000 motorcycle collisions
** Fatal Collisions per 1,000 motorcycles registered
*** Motorcycle involved per 100 registered

## Motorcycle Collisions By Location

Table 5-2 displays a breakdown of motorcycle collision data by total for urban and rural areas as well as the state as a whole for 1987 and 1986. In 1987 rural areas again led urban areas in the total number of fatal collisions, 61 to 27, while urban areas led rural areas in total number of injury collisions, 1,486 to 1,330.

Table 5-2

MOTORCYCLE COLLISIONS BY LOCATION
Two Year Comparison

| Severity of Collision | 1987 | | | 1986 | | |
|---|---|---|---|---|---|---|
| | Urban | Rural | Statewide | Urban | Rural | Statewide |
| Total Collisions | 1,845 | 1,534 | 3,379 | 2,026 | 1,482 | 3,508 |
| Fatal Collisions | 27 | 61 | 88 | 35 | 45 | 80 |
| Injury Collisions | 1,486 | 1,330 | 2,816 | 1,685 | 1,318 | 3,003 |
| Property Damage Only, Collisions | 332 | 143 | 475 | 306 | 119 | 425 |
| Total Fatalities | 27 | 63 | 90 | 35 | 46 | 81 |
| All Persons Injured | 1,821 | 1,676 | 3,497 | 2,049 | 1,624 | 3,673 |
| Motorcyclists Killed | 27 | 63 | 90 | 33 | 47 | 80 |
| Motorcyclists Injured | 1,702 | 1,586 | 3,288 | 1,904 | 1,523 | 3,427 |

A further breakdown of 1987 motorcycle collisions by road type indicates that 52.1% of the total collisions, 50.5% of the injury collisions and 28.4% of the fatal accidents occurred on city streets. 29.5% of the injury collisions, 28.3% of the total collisions and 46.6% of the fatal collisions happened on county roads. State routes recorded 10.3% of the injury and 10.1% of the total collisions as well as 12.5% of the fatal motorcycle collisions (Table 5-3).

Table 5-3

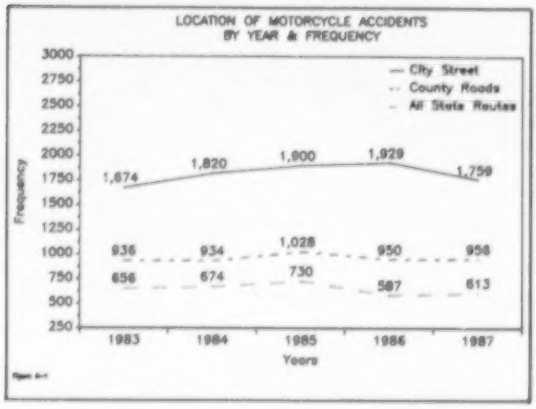
MOTORCYCLE COLLISIONS
by Location

| Location | Collisions | | | | Persons | |
|---|---|---|---|---|---|---|
| | Total | Fatal | Injury | P.D. Only* | Killed | Injured |
| Interstate System | 158 | 5 | 123 | 30 | 5 | 138 |
| Other Full Control | 51 | 1 | 44 | 6 | 1 | 47 |
| U.S. Route No.** | 64 | 5 | 57 | 2 | 5 | 72 |
| State Route No.** | 340 | 11 | 291 | 38 | 12 | 348 |
| County Roads | 956 | 41 | 831 | 84 | 42 | 994 |
| City Streets*** | 1,759 | 25 | 1,421 | 313 | 25 | 1,630 |
| Other Traffic Ways | 51 | 0 | 49 | 2 | 0 | 59 |
| Total | 3,379 | 88 | 2,816 | 475 | 90 | 3,288 |

* Property Damage Only
** Excluding city streets
*** Including U.S. and State Routes in Cities

Total frequency of motorcycle collisions occurring on city streets decreased during 1987. This reverses a previous 3-year increase. Motorcycle collisions occurring on state routes recorded a slight increase after experiencing a six-year low of 587 collisions in 1986. County roads also recorded a slight increase after a one-year decrease in the number of collisions recorded in 1986. (Figure 5-1).

**Figure 5-1**




## Motorcycle Collisions By Age Group

The 16-29 year old motorcycle rider continues to be over-represented in the accident population compared to the percentage of licensed motorcycle drivers comprising that age group. The 16-18 year old were involved in 13.3% of the total collisions, but comprise less than 1% of the motorcyclists licensed to drive. From age 30 on up, motorcycle riders are under-represented (Table 5-4).

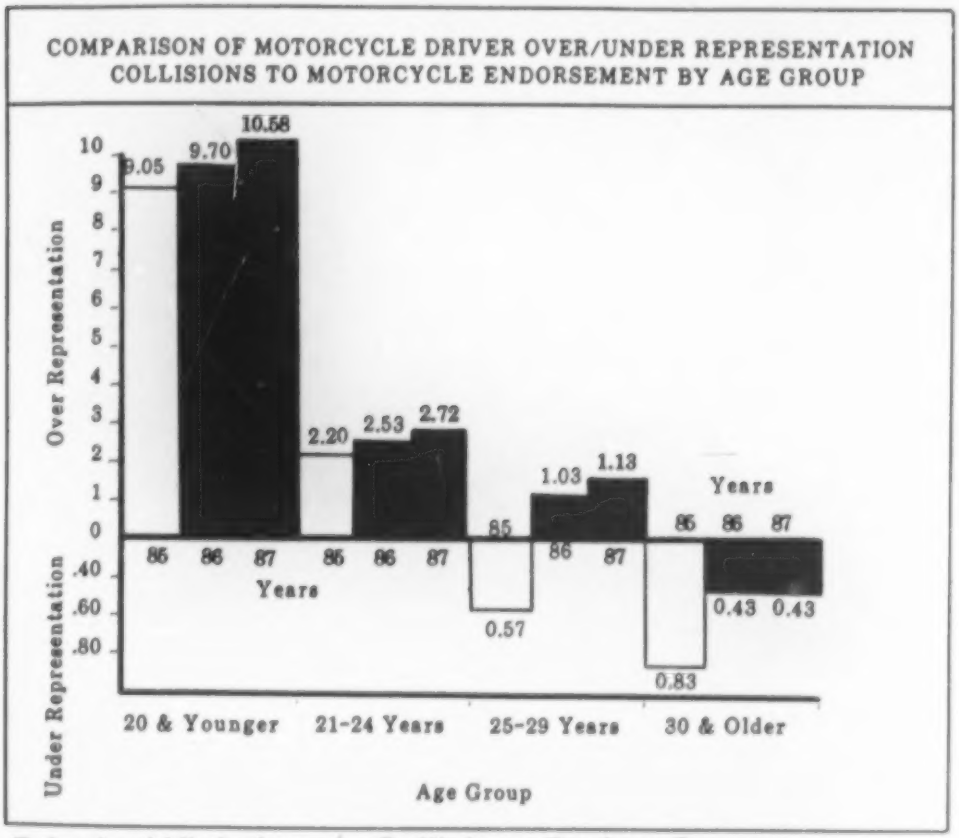
Table 5-4

MOTORCYCLE RIDERS
Comparison of Collisions to Licensed Drivers

| Age | Fatal Collisions | | Injury Collisions | | Total Collisions | | % of Licensed Drivers | Over/Under Ratio |
|---|---|---|---|---|---|---|---|---|
| | Number | % | Number | % | Number | % | | |
| Under 16 | 5 | 5.6% | 68 | 2.4% | 81 | 2.5% | 0.00 | 0.00 |
| 16 | 2 | 2.2% | 66 | 2.4% | 75 | 2.3% | 0.05% | 46.60% |
| 17-18 | 9 | 10.0% | 309 | 11.1% | 355 | 11.0% | 0.69% | 16.01% |
| 19-20 | 8 | 8.9% | 383 | 13.8% | 430 | 13.4% | 2.03% | 6.59% |
| 21-22 | 11 | 12.2% | 303 | 10.9% | 341 | 10.6% | 3.10% | 3.42% |
| 23-24 | 6 | 6.7% | 286 | 10.3% | 328 | 10.2% | 4.55% | 2.24% |
| 25-29 | 23 | 25.6% | 487 | 17.5% | 584 | 18.2% | 16.17% | 1.12% |
| 30-34 | 12 | 13.3% | 326 | 11.7% | 374 | 11.6% | 21.31% | 0.54% |
| 35-39 | 5 | 5.6% | 223 | 8.0% | 257 | 8.0% | 17.96% | 0.44% |
| 40-44 | 6 | 6.7% | 140 | 5.0% | 171 | 5.3% | 12.50% | 0.42% |
| 45-54 | 2 | 2.2% | 128 | 4.6% | 145 | 4.5% | 12.44% | 0.36% |
| 55-64 | 1 | 1.1% | 44 | 1.6% | 51 | 1.6% | 6.27% | 0.25% |
| 65 & over | 0 | 0.0% | 19 | 0.7% | 21 | 0.7% | 2.93% | 0.22% |

Figure 5-2 shows that motorcycle riders under 29 years of age, and particularly those 20 years old and younger, are over-represented in total motorcycle accident involvement when compared to the percentages of licensed motorcycle riders comprising these age groups. The 30 year old and over age group continue to be under-represented.

Figure 5-2




## Principal Violations in Collisions By Age Groups

Speed too fast for conditions was the principal cause of motorcycle collisions for all age groups in 1987, contributing to 27.4% of the year's motorcycle violations. Motorcyclists' driving over the speed limit was the second leading violation contributing 13.8% to the violation total. Driving while intoxicated was the third most prominent violation, contributing 13.2% to the total of motorcycle driver violations. In the 21 to 44 age group, driving while under the influence of intoxicating liquor was the second leading violation (Table 5-5).

Table 5-5

MOTORCYCLIST VIOLATIONS BY AGE
Investigated Collisions Only

| Violation | Violations | | Age of Violator | | | | | | | Number Not Stated |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total | % | 20 & Under | 21-24 | 25-29 | 30-34 | 35-44 | 45-54 | 55 & Over | |
| Speed - Conditions | 638 | 27.4% | 206 | 130 | 113 | 70 | 62 | 21 | 5 | 31 |
| Speed - Over Legal | 320 | 13.8% | 114 | 72 | 61 | 30 | 29 | 2 | 3 | 9 |
| Failed to Yield | 122 | 5.2% | 53 | 17 | 17 | 12 | 7 | 4 | 4 | 8 |
| D.W.I. | 306 | 13.2% | 52 | 80 | 70 | 47 | 40 | 9 | 2 | 6 |
| Following Too Closely | 146 | 6.3% | 53 | 34 | 21 | 15 | 12 | 8 | 1 | 2 |
| Improper Passing | 121 | 5.2% | 31 | 36 | 22 | 12 | 14 | 1 | 1 | 4 |
| Operating Defective Equipment | 97 | 4.2% | 40 | 17 | 7 | 14 | 10 | 6 | 1 | 2 |
| Disregard Signs/Signals | 95 | 4.1% | 33 | 24 | 16 | 10 | 6 | 1 | 2 | 3 |
| Over Centerline | 69 | 3.0% | 20 | 14 | 19 | 5 | 7 | 1 | 1 | 2 |
| Other Violations | 412 | 17.7% | 131 | 69 | 59 | 51 | 53 | 16 | 10 | 23 |
| Total | 2,326 | 100.0% | 733 | 493 | 405 | 266 | 240 | 69 | 30 | 90 |

## Motorcycle Collisions By First Harmful Event

In 1987 the most common first harmful event causing a single motorcycle collision was overturning. This cause predominated for all age groups. In multiple vehicle collisions involving motorcycles, the rear-end collision was most prevalent (16%). Angular collisions constituted the next most common event (14.7%) in multiple vehicle motorcycle collisions. Collisions occurring while entering or leaving a driveway contributed to 11.6% of all motorcycle collisions. (Table 5-6).

Table 5-6

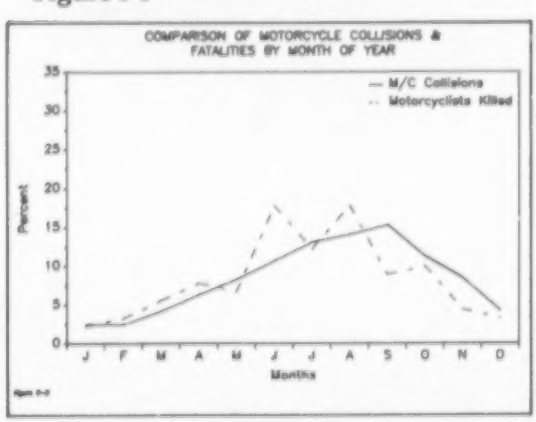
MOTORCYCLE COLLISIONS
By First Harmful Event

| Type of Collision | Collisions | | Age of Motorcyclist | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | % | 20 & Under | 21-24 | 25-29 | 30-34 | 35-44 | 45-54 | 55 & Over |
| Single Motorcycle Collision | | | | | | | | | |
| Struck Fixed Object | 334 | 10.4% | 109 | 61 | 60 | 56 | 28 | 13 | 7 |
| Struck Other Object | 10 | 0.3% | 6 | 2 | 1 | 0 | 1 | 0 | 0 |
| Overturned | 763 | 23.7% | 195 | 143 | 129 | 111 | 130 | 39 | 16 |
| Motorcycle-Pedestrian | 24 | 0.7% | 7 | 7 | 3 | 4 | 2 | 1 | 0 |
| Motorcycle-R.R. Train | 1 | 0.0% | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Motorcycle-Pedalcyclist | 18 | 0.6% | 5 | 4 | 4 | 2 | 1 | 1 | 1 |
| Motorcycle-Animal | 70 | 2.2% | 19 | 8 | 13 | 8 | 12 | 8 | 2 |
| Non-Collision | 39 | 1.2% | 13 | 12 | 7 | 1 | 4 | 1 | 1 |
| Total Single Motorcycle Collisions | 1,259 | 39.2% | 355 | 237 | 217 | 182 | 178 | 63 | 27 |
| Multiple Vehicle Collision | | | | | | | | | |
| Head-on | 60 | 1.9% | 28 | 10 | 11 | 7 | 2 | 0 | 2 |
| Rear-end | 513 | 16.0% | 138 | 114 | 90 | 55 | 81 | 26 | 9 |
| Sideswipe | 154 | 4.8% | 42 | 30 | 36 | 12 | 25 | 6 | 3 |
| Angular Direction | 473 | 14.7% | 143 | 99 | 86 | 43 | 60 | 25 | 17 |
| Enter/Leave Driveway | 374 | 11.6% | 127 | 86 | 63 | 40 | 41 | 12 | 5 |
| One Left/One Straight-Opp. Dir. | 235 | 7.3% | 62 | 52 | 60 | 24 | 22 | 9 | 6 |
| Other Multiple Vehicle Collision | 145 | 4.5% | 46 | 41 | 21 | 11 | 19 | 4 | 3 |
| Total Multiple Vehicle Collisions | 1,954 | 60.8% | 586 | 432 | 367 | 192 | 250 | 82 | 45 |
| TOTAL MOTORCYCLE COLLISIONS | 3,213 | 100.0% | 941 | 669 | 584 | 374 | 428 | 145 | 72 |

## Time of Motorcycle Collision Occurrence

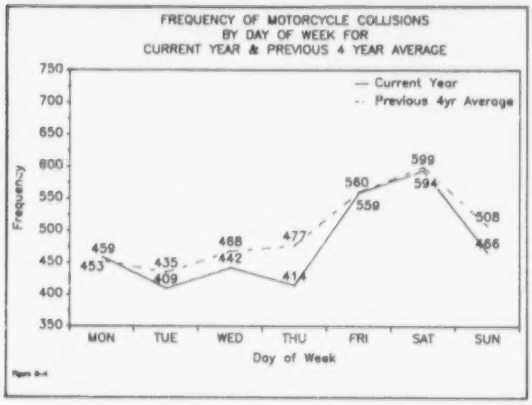
The milder weather months (May-September) of 1987 recorded the greatest percentage of motorcycle collisions. June through August recorded the most fatalities (Figure 5-3).

**Figure 5-3**



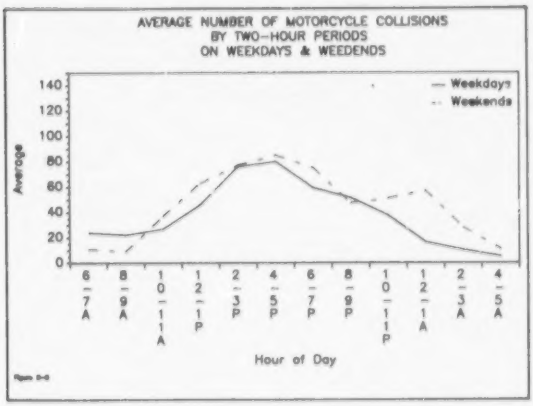
In comparing the frequencies of motorcycle collisions by day of week, Friday and Saturday are seen as the two days with the highest rate of occurrences. This trend has been consistent throughout the four-year baseline period and continued in 1987 as well (Figure 5-4).

**Figure 5-4**




A further breakdown by hour of day when motorcycle collisions were occurring in 1987 reveals that the weekday hours from 2 p.m. to 8 p.m. constituted the most dangerous period of the day. The noon to 6 p.m. time frame provided to be a dangerous time of day for weekend motorcycling (Figure 5-5).

**Figure 5-5**



# Pedalcycles

## Overview

In 1987 total pedalcycle accidents increased 20.3% over the previous four-year average. The number of pedalcyclists killed increased 46.9% from the baseline period. The number of persons injured was up 18.2%. (Table 6-1).

Table 6-1

PEDALCYCLE TRAFFIC COLLISIONS
Five Year Comparison

| Severity | Years | | | | | Previous 4 Year Average | % of Change 86 - 4 Year Average |
|---|---|---|---|---|---|---|---|
| | 1987 | 1986 | 1985 | 1984 | 1983 | | |
| Total Collisions | 1,575 | 1,507 | 1,325 | 1,174 | 1,230 | 1,309 | 20.32% |
| Persons Killed | 18 | 12 | 12 | 11 | 14 | 12 | 46.94% |
| Persons Injured | 1,584 | 1,538 | 1,354 | 1,204 | 1,266 | 1,341 | 18.16% |

## Rural - Urban Pedalcycle Collisions

Total pedalcycle collisions in 1987 were up 27.0% in rural areas and up 17.0% in urban areas compared to a four-year baseline period. The number of persons killed in rural areas in 1987 was 15, up seven from the baseline, while three persons died in urban pedalcycle collisions, down one from the average of the previous four years. Rural injuries from pedalcycle collisions were up 25.1% in 1987 over baseline while urban injuries in this regard were up 14.7% (Table 6-2).

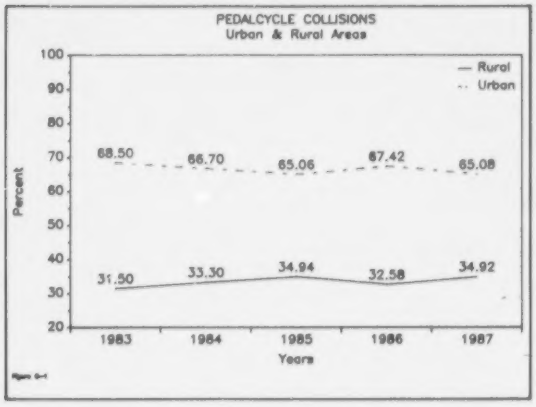
Table 6-2

RURAL & URBAN PEDALCYCLE ACCIDENTS
Five Year Comparison

| Severity by Areas | Years | | | | | Previous 4 Year Average | % of Change 86 - 4 Year Average |
|---|---|---|---|---|---|---|---|
| | 1987 | 1986 | 1985 | 1984 | 1983 | | |
| Rural Areas | | | | | | | |
| Total Collisions | 550 | 491 | 463 | 391 | 387 | 433 | 27.02% |
| Persons Killed | 15 | 6 | 9 | 8 | 10 | 8 | 81.82% |
| Persons Injured | 559 | 510 | 472 | 405 | 401 | 447 | 25.06% |
| Urban Areas | | | | | | | |
| Total Collisions | 1,025 | 1,016 | 862 | 783 | 843 | 876 | 17.01% |
| Persons Killed | 3 | 6 | 3 | 3 | 4 | 4 | -25.00% |
| Persons Injured | 1,025 | 1,028 | 882 | 799 | 865 | 894 | 14.72% |

In 1987, 65.1% of the pedalcycle collisions occurred in urban areas, continuing a downward trend from 1982's high of 69.6%. Rural areas, however, experienced an increase in 1987, and continued an upward trend starting in 1982 after a one year drop in 1986 (Figure 6-1).

**Figure 6-1**




## Pedalcyclists Killed And Injured - By Age

In 1987, 16.7% of the pedalcyclists killed were in the 5-9 age bracket. The 10-14 group experienced 28.6% of the injuries. The number of pedalcyclists killed in 1987 increased by six from the four-year average while injuries rose by 242 (Table 6-3 and 6-4)

Table 6-3

PEDALCYCLISTS KILLED BY AGE
Five Year Comparison

| Age | Years | | | | | Previous 4 Year Average | % of Change 86 - 4 Year Average |
|---|---|---|---|---|---|---|---|
| | 1987 | 1986 | 1985 | 1984 | 1983 | | |
| 0-4 | 0 | 2 | 0 | 0 | 1 | 1 | -100.00% |
| 5-9 | 4 | 2 | 3 | 1 | 1 | 2 | 128.57% |
| 10-14 | 3 | 3 | 2 | 2 | 5 | 3 | 0.00% |
| 15-19 | 2 | 1 | 2 | 1 | 4 | 2 | 0.00% |
| 20-24 | 2 | 1 | 0 | 0 | 2 | 1 | 166.67% |
| 25-34 | 3 | 3 | 1 | 0 | 0 | 1 | 200.00% |
| 35-44 | 1 | 0 | 1 | 3 | 0 | 1 | 0.00% |
| 45-54 | 2 | 0 | 2 | 0 | 0 | 1 | 300.00% |
| 55-64 | 1 | 0 | 1 | 0 | 0 | 0 | 300.00% |
| 65-74 | 0 | 0 | 0 | 1 | 1 | 1 | -100.00% |
| 75 & Older | 0 | 0 | 0 | 0 | 0 | 0 | 0.00% |
| Not Stated | 0 | 0 | 0 | 0 | 0 | 0 | 0.00% |
| TOTAL | 18 | 12 | 12 | 8 | 14 | 12 | 56.52% |

Table 6-4

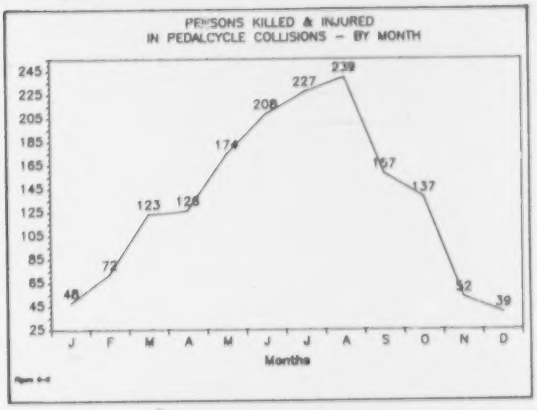
PEDALCYCLISTS INJURED BY AGE
Five Year Comparison

| Age | Years 1987 | 1986 | 1985 | 1984 | 1983 | Previous 4 Year Average | % of Change 86 - 4 Year Average |
|---|---|---|---|---|---|---|---|
| 0-4 | 23 | 18 | 31 | 19 | 21 | 22 | 3.37% |
| 5-9 | 284 | 266 | 251 | 171 | 180 | 217 | 30.88% |
| 10-14 | 444 | 443 | 403 | 359 | 404 | 402 | 10.38% |
| 15-19 | 302 | 296 | 241 | 240 | 240 | 254 | 18.78% |
| 20-24 | 155 | 176 | 155 | 122 | 113 | 142 | 9.54% |
| 25-34 | 166 | 170 | 143 | 147 | 139 | 150 | 10.85% |
| 35-44 | 63 | 56 | 38 | 35 | 47 | 44 | 43.18% |
| 45-54 | 20 | 18 | 15 | 17 | 11 | 15 | 31.15% |
| 55-64 | 13 | 12 | 8 | 8 | 11 | 10 | 33.33% |
| 65-74 | 17 | 7 | 2 | 11 | 4 | 6 | 183.33% |
| 75 & Older | 2 | 2 | 1 | 2 | 4 | 2 | -11.11% |
| Not Stated | 63 | 43 | 37 | 41 | 63 | 46 | 36.96% |
| TOTAL | 1,552 | 1,507 | 1,325 | 1,172 | 1,237 | 1,310 | 18.45% |

## Pedalcycle Fatal And Injury Collisions - By Month

The months of May through September accounted for 62.7% of all injury and fatal pedalcycle accidents and total pedalcycle injuries and deaths for 1987 (Figure 6-2).

**Figure 6-2**




The City of Port Angeles experienced the highest pedalcycle collision rate in the state during 1987 with 98.49 collisions per 100,000 population. Puyallup recorded the second highest collision rate in the state at 95.81 collisions per 100,000 population, followed by Bellingham with 77.65 and Kent with a 76.44 pedalcycle collision rate. (Table 6-5).

Table 6-5

PEDALCYCLE COLLISION RATE BY POPULATION
Cities 15,000 Population & Greater

| City | 1987 Population | Pedalcycle Deaths | | Pedalcycle Injuries | | Total Ped Collision | |
|---|---|---|---|---|---|---|---|
| | | Number | Rate* | Number | Rate* | Number | Rate* |
| 250,000 and Over | | | | | | | |
| 1. Seattle | 491,300 | 0 | 0.00 | 262 | 53.33 | 265 | 53.94 |
| 100,000 to 250,000 | | | | | | | |
| 1. Spokane | 172,100 | 0 | 0.00 | 80 | 46.48 | 82 | 47.65 |
| 2. Tacoma | 158,900 | 0 | 0.00 | 80 | 50.35 | 81 | 50.98 |
| 50,000 to 100,000 | | | | | | | |
| 1. Bellevue | 82,070 | 0 | 0.00 | 49 | 59.71 | 50 | 60.92 |
| 2. Everett | 60,100 | 0 | 0.00 | 31 | 51.58 | 28 | 46.59 |
| 25,000 to 50,000 | | | | | | | |
| 1. Yakima | 49,600 | 0 | 0.00 | 30 | 60.48 | 30 | 60.48 |
| 2. Bellingham | 46,360 | 0 | 0.00 | 36 | 77.65 | 36 | 77.65 |
| 3. Vancouver | 43,390 | 0 | 0.00 | 22 | 50.70 | 22 | 50.70 |
| 4. Kennewick | 37,320 | 0 | 0.00 | 15 | 40.19 | 15 | 40.19 |
| 5. Renton | 35,360 | 0 | 0.00 | 13 | 36.76 | 13 | 36.76 |
| 6. Bremerton | 32,390 | 0 | 0.00 | 21 | 64.83 | 22 | 67.92 |
| 7. Richland | 30,280 | 0 | 0.00 | 9 | 29.72 | 9 | 29.72 |
| 8. Auburn | 30,260 | 0 | 0.00 | 8 | 26.44 | 8 | 26.44 |
| 9. Redmond | 30,260 | 0 | 0.00 | 14 | 46.27 | 14 | 46.27 |
| 10. Kent | 30,090 | 0 | 0.00 | 22 | 73.11 | 23 | 76.44 |
| 11. Olympia | 29,600 | 0 | 0.00 | 17 | 57.43 | 17 | 57.43 |
| 12. Longview | 29,520 | 0 | 0.00 | 18 | 60.98 | 19 | 64.36 |
| 13. Edmonds | 28,300 | 0 | 0.00 | 10 | 35.34 | 10 | 35.34 |
| 14. Walla Walla | 25,420 | 0 | 0.00 | 12 | 47.21 | 12 | 47.21 |
| 15,000 to 25,000 | | | | | | | |
| 1. Lynnwood | 24,260 | 1 | 4.12 | 15 | 61.83 | 16 | 65.95 |
| 2. Pullman | 22,240 | 0 | 0.00 | 11 | 49.46 | 13 | 58.45 |
| 3. Mercer Island | 20,760 | 0 | 0.00 | 3 | 14.45 | 4 | 19.27 |
| 4. Puyallup | 19,830 | 0 | 0.00 | 20 | 100.86 | 19 | 95.81 |
| 5. Kirkland | 19,430 | 0 | 0.00 | 10 | 51.47 | 11 | 56.61 |
| 6. Pasco | 18,520 | 0 | 0.00 | 4 | 21.60 | 4 | 21.60 |
| 7. Wenatchee | 18,480 | 0 | 0.00 | 3 | 16.23 | 3 | 16.23 |
| 8. Port Angeles | 17,260 | 0 | 0.00 | 15 | 86.91 | 17 | 98.49 |
| 9. Aberdeen | 17,000 | 0 | 0.00 | 2 | 11.76 | 2 | 11.76 |
| 10. Mountlake Terrace | 16,060 | 0 | 0.00 | 3 | 18.68 | 3 | 18.68 |
| 11. Lacey | 15,840 | 0 | 0.00 | 12 | 75.76 | 11 | 69.44 |

*Frequency per 100,000 population

# Pedestrians

## Overview

The 93 pedestrians killed in 1987 was up 2.2% over the four-year average. The 1,830 pedestrians injured were 5.7% above the four-year baseline (Table 7-1).

Table 7-1

PEDESTRIANS KILLED AND INJURED STATEWIDE - URBAN & RURAL
Five Year Comparison

| Severity | Years | | | | | Previous 4 Year Average | % of Change 86 - 4 Year Average |
|---|---|---|---|---|---|---|---|
| | 1987 | 1986 | 1985 | 1984 | 1983 | | |
| Pedestrians Killed | 93 | 89 | 89 | 97 | 89 | 91 | 2.20% |
| Pedestrians Injured | 1,830 | 1,752 | 1,763 | 1,710 | 1,701 | 1,732 | 5.69% |

## Locations And Age Groups Of Pedestrian Collisions

In 1987 pedestrian fatalities in rural areas was down 10 or 21.7% from the previous four-year average and injuries were down 3.9%. Urban area pedestrian fatalities in 1987 increased 23.4% from baseline and injuries increased 3.6% (Table 7-2).

Table 7-2

RURAL & URBAN PEDESTRIAN ACCIDENTS
Five Year Comparison

| Severity by Area | Years | | | | | Previous 4 Year Average | % of Change 86 - 4 Year Average |
|---|---|---|---|---|---|---|---|
| | 1987 | 1986 | 1985 | 1984 | 1983 | | |
| Rural Areas | | | | | | | |
| Pedestrians Killed | 37 | 49 | 45 | 51 | 44 | 47 | -21.69% |
| Pedestrians Injure | 441 | 432 | 483 | 449 | 471 | 459 | -3.87% |
| Urban Areas* | | | | | | | |
| Pedestrians Killed | 54 | 40 | 44 | 46 | 45 | 44 | 23.43% |
| Pedestrians Injure | 1,319 | 1,320 | 1,280 | 1,261 | 1,230 | 1,273 | 3.63% |

* 2,500 population and greater

## Pedestrians Killed And Injured - By Age

In 1987, the overall number of pedestrians killed increased by 4 from the 89 killed in both 1985 and 1986 and up 2 from the 4 year baseline average. The number of younger pedestrians ages 14 years and younger increased from eight in 1986 to sixteen in 1987 and up one when compared to the previous four-year average. The number of older (65 & older) pedestrians injured was down thirteen from the previous four-year average. The largest percentage increases in pedestrians injured during 1987 was in the 35-44 year age bracket and the 9 year and younger age bracket recording a 31.8% increase and 15.9% increase respectively when compared to the baseline average (Tables 7-3 and 7-3a).

Table 7-3

PEDESTRIANS KILLED BY AGE
Five Year Comparison

| Age | Years | | | | | Previous 4 Year Average | % of Change 86 - 4 Year Average |
|---|---|---|---|---|---|---|---|
| | 1987 | 1986 | 1985 | 1984 | 1983 | | |
| 0-4 | 5 | 2 | 3 | 8 | 4 | 4 | 17.65% |
| 5-9 | 5 | 4 | 11 | 6 | 6 | 7 | -25.93% |
| 10-14 | 6 | 2 | 3 | 8 | 4 | 4 | 41.18% |
| 15-19 | 7 | 10 | 3 | 6 | 13 | 8 | -12.50% |
| 20-24 | 2 | 7 | 5 | 9 | 6 | 7 | -70.37% |
| 25-34 | 14 | 12 | 11 | 18 | 12 | 13 | 5.66% |
| 35-44 | 11 | 13 | 9 | 8 | 10 | 10 | 10.00% |
| 45-54 | 11 | 7 | 7 | 4 | 5 | 6 | 91.30% |
| 55-64 | 11 | 10 | 9 | 11 | 8 | 10 | 15.79% |
| 65-74 | 7 | 8 | 7 | 6 | 8 | 7 | -3.45% |
| 75 & Older | 14 | 14 | 21 | 13 | 13 | 15 | -8.20% |
| Not Stated | 0 | 0 | 0 | 0 | 0 | 0 | 0.00% |
| TOTAL | 93 | 89 | 89 | 97 | 89 | 91 | 2.20% |

Table 7-3a

PEDESTRIANS INJURED BY AGE
Five Year Comparison

| Age | Years | | | | | Previous 4 Year Average | % of Change 86 - 4 Year Average |
|---|---|---|---|---|---|---|---|
| | 1987 | 1986 | 1985 | 1984 | 1983 | | |
| 0-4 | 92 | 77 | 83 | 75 | 84 | 80 | 15.36% |
| 5-9 | 251 | 231 | 203 | 215 | 216 | 216 | 16.07% |
| 10-14 | 196 | 198 | 195 | 194 | 216 | 201 | -2.37% |
| 15-19 | 206 | 206 | 208 | 215 | 209 | 210 | -1.67% |
| 20-24 | 166 | 151 | 181 | 167 | 163 | 166 | 0.30% |
| 25-34 | 289 | 290 | 285 | 255 | 222 | 263 | 9.89% |
| 35-44 | 196 | 176 | 169 | 126 | 124 | 149 | 31.76% |
| 45-54 | 108 | 111 | 99 | 121 | 97 | 107 | 0.93% |
| 55-64 | 84 | 76 | 90 | 89 | 89 | 86 | -2.33% |
| 65-74 | 83 | 72 | 92 | 89 | 90 | 86 | -3.21% |
| 75 & Older | 76 | 98 | 82 | 80 | 89 | 87 | -12.89% |
| Not Stated | 83 | 66 | 76 | 84 | 102 | 82 | 1.22% |
| TOTAL | 1,830 | 1,752 | 1,763 | 1,710 | 1,701 | 1,732 | 5.69% |

## Actions Of Pedestrians Killed and Injured

Thirty-six percent of the pedestrians killed or injured in the rural area of the state were struck while crossing the roadway, not at an intersection, during 1987. Another 15.4% were killed or injured while crossing at an intersection. The largest percentage of these pedestrians were in a ten-year age group of five to 14 years (Table 7-4).

Table 7-4

ACTIONS OF PEDESTRIANS KILLED & INJURED
Rural Areas

| Action | Killed | | Killed/Injured | | Age | | | | | Number Not Stated |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number | % | Number | % | 0-4 | 5-14 | 15-24 | 25-64 | 65+ | |
| Rural: | | | | | | | | | | |
| Crossing, entering roadway at intersection | 6 | 15.4% | 97 | 19.0% | 2 | 30 | 16 | 40 | 6 | 3 |
| Not at intersection | 14 | 35.9% | 177 | 34.6% | 12 | 80 | 35 | 58 | 10 | 2 |
| Walking with traffic | 1 | 2.6% | 26 | 5.1% | 1 | 6 | 5 | 12 | 1 | 1 |
| Walking against traffic | 0 | 0.0% | 14 | 2.7% | 0 | 1 | 8 | 4 | 1 | 0 |
| Standing or working in roadway | 5 | 12.8% | 53 | 10.4% | 1 | 3 | 12 | 30 | 2 | 5 |
| Playing in roadway | 0 | 0.0% | 24 | 4.7% | 2 | 18 | 3 | 0 | 0 | 1 |
| Lying in roadway | 4 | 10.3% | 6 | 1.2% | 0 | 0 | 3 | 3 | 0 | 0 |
| Not in roadway | 6 | 15.4% | 82 | 16.0% | 1 | 6 | 28 | 42 | 2 | 3 |
| Other & Not Stated | 3 | 7.7% | 32 | 6.3% | 0 | 9 | 9 | 11 | 3 | 0 |
| TOTAL RURAL | 39 | 100.0% | 511 | 100.0% | 19 | 133 | 119 | 200 | 25 | 15 |
| % of Total Killed or Injured | | | | | 3.7% | 26.0% | 23.3% | 39.1% | 4.9% | 2.9% |

## Actions Of Pedestrians Killed and Injured

In urban areas in 1987, the most frequently involved pedestrian in fatal and injury accidents fell into the 25-64 year old age group, which accounted for 37.0% of all pedestrians killed or injured in traffic accidents. The most common contributing action of this age group was "crossing, entering roadway at intersection." Fifty two of the 79 (65.8%) of the pedestrians four years of age or younger were killed or injured while crossing the roadway between intersections. Nearly forty six (45.9%) of the pedestrians age 5-14 were also killed or injured while crossing between intersections (Table 7-5).

Table 7-5

ACTIONS OF PEDESTRIANS KILLED & INJURED
Urban Areas

| Action | Killed | | Killed/Injured | | Age | | | | | Number Not Stated |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number | % | Number | % | 0-4 | 5-14 | 15-24 | 25-64 | 65+ | |
| Urban: | | | | | | | | | | |
| Crossing, entering roadway at intersection | 20 | 37.0% | 671 | 47.1% | 15 | 123 | 130 | 265 | 103 | 35 |
| Not at intersection | 17 | 31.5% | 460 | 32.3% | 52 | 151 | 74 | 128 | 38 | 17 |
| Walking with traffic | 2 | 3.7% | 19 | 1.3% | 0 | 4 | 6 | 6 | 1 | 2 |
| Walking against traffic | 0 | 0.0% | 6 | 0.4% | 0 | 3 | 1 | 2 | 0 | 0 |
| Standing or working in roadway | 1 | 1.9% | 70 | 4.9% | 1 | 6 | 20 | 35 | 2 | 6 |
| Playing in roadway | 3 | 5.6% | 34 | 2.4% | 5 | 18 | 5 | 5 | 0 | 1 |
| Lying in roadway | 3 | 5.6% | 4 | 0.3% | 0 | 0 | 0 | 4 | 0 | 0 |
| Not in roadway | 7 | 13.0% | 79 | 5.5% | 5 | 11 | 15 | 39 | 6 | 3 |
| Other & Not Stated | 1 | 1.9% | 82 | 5.8% | 1 | 13 | 14 | 43 | 5 | 6 |
| TOTAL URBAN | 54 | 100.0% | 1,425 | 100.0% | 79 | 329 | 265 | 527 | 155 | 70 |
| % OF TOTAL KILLED OR INJURED | | | | | 5.5% | 23.1% | 18.6% | 37.0% | 10.9% | 4.9% |

## Pedestrian Collisions By Day Of Week and Hour Of Day

In 1987, Wednesday, Friday and Saturday were the three high days for pedestrian fatalities recording 15.3%, 27.0%, and 15.7% deaths respectively. Friday also recorded the highest number of reported pedestrian collisions (Figure 7-1). The 6 p.m. to 9 p.m. time period evidenced the greatest percentage of fatal pedestrian collisions at 25.8%. The 3 p.m. to 6 p.m. recorded the greatest number of reported pedestrian collisions with 31.2% (Figure 7-2).

**Figure 7-1**

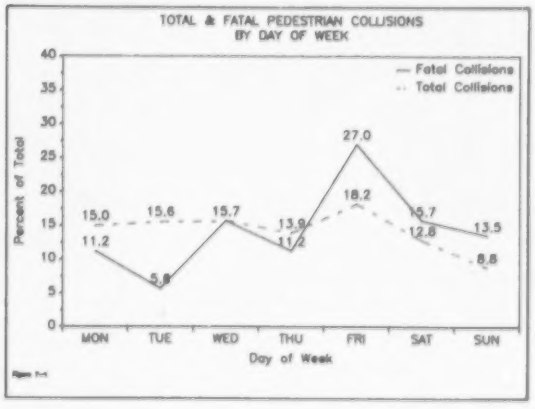


**Figure 7-2**

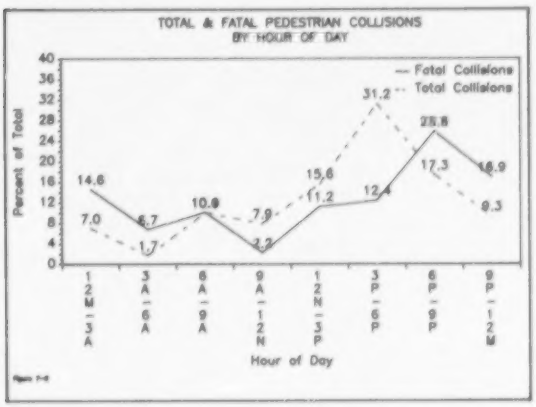



Table 7-6 (next page) presents the 1987 number and rates for pedestrian traffic deaths, injuries, and total collisions for cities of 15,000 or more in Washington. Seattle had the greatest number of fatalities, but Aberdeen had the greatest rate of pedestrian fatalities at 11.76 per 100,000 population based on two pedestrian deaths. Seattle had the greatest number of pedestrian collisions and pedestrian injuries and also had the highest rate for total pedestrian collisions (101.16 per 100,000 population) and second highest rate for pedestrian injuries (105.84 per 100,000). Wentachee had the highest pedestrian injury rate with 119.05 (Table 7-6).

Table 7-6

PEDESTRIAN COLLISION RATE BY POPULATION
Cities 15,000 Population & Greater

| City | 1987 Population | Pedestrian Deaths | | Pedestrian Injuries | | Total Ped Collision | |
|---|---|---|---|---|---|---|---|
| | | Number | Rate* | Number | Rate* | Number | Rate* |
| 250,000 and Over | | | | | | | |
| 1. Seattle | 491,300 | 15 | 3.05 | 520 | 105.84 | 497 | 101.16 |
| 100,000 to 250,000 | | | | | | | |
| 1. Spokane | 172,100 | 5 | 2.91 | 143 | 83.09 | 136 | 79.02 |
| 2. Tacoma | 158,900 | 4 | 2.52 | 134 | 84.33 | 128 | 80.55 |
| 50,000 to 100,000 | | | | | | | |
| 1. Bellevue | 82,070 | 1 | 1.22 | 29 | 35.34 | 29 | 35.34 |
| 2. Everett | 60,100 | 6 | 9.98 | 38 | 63.23 | 40 | 66.56 |
| 25,000 to 50,000 | | | | | | | |
| 1. Yakima | 49,600 | 1 | 2.02 | 31 | 62.50 | 32 | 64.52 |
| 2. Bellingham | 46,360 | 0 | 0.00 | 26 | 56.08 | 23 | 49.61 |
| 3. Vancouver | 43,390 | 0 | 0.00 | 22 | 50.70 | 22 | 50.70 |
| 4. Kennewick | 37,320 | 2 | 5.36 | 10 | 26.80 | 11 | 29.47 |
| 5. Renton | 35,360 | 0 | 0.00 | 18 | 50.90 | 16 | 45.25 |
| 6. Bremerton | 32,390 | 2 | 6.17 | 25 | 77.18 | 27 | 83.36 |
| 7. Richland | 30,280 | 0 | 0.00 | 6 | 19.82 | 4 | 13.21 |
| 8. Auburn | 30,260 | 0 | 0.00 | 15 | 49.57 | 12 | 39.66 |
| 9. Redmond | 30,260 | 0 | 0.00 | 8 | 26.44 | 7 | 23.13 |
| 10. Kent | 30,090 | 3 | 9.97 | 29 | 96.38 | 30 | 99.70 |
| 11. Olympia | 29,600 | 0 | 0.00 | 16 | 54.05 | 16 | 54.05 |
| 12. Longview | 29,520 | 0 | 0.00 | 21 | 71.14 | 18 | 60.98 |
| 13. Edmonds | 28,300 | 1 | 3.53 | 12 | 42.40 | 12 | 42.40 |
| 14. Walla Walla | 25,420 | 0 | 0.00 | 13 | 51.14 | 13 | 51.14 |
| 15,000 to 25,000 | | | | | | | |
| 1. Lynnwood | 24,260 | 0 | 0.00 | 18 | 74.20 | 18 | 74.20 |
| 2. Pullman | 22,240 | 0 | 0.00 | 4 | 17.99 | 4 | 17.99 |
| 3. Mercer Island | 20,760 | 0 | 0.00 | 4 | 19.27 | 4 | 19.27 |
| 4. Puyallup | 19,830 | 0 | 0.00 | 11 | 55.47 | 10 | 50.43 |
| 5. Kirkland | 19,430 | 1 | 5.15 | 14 | 72.05 | 12 | 61.76 |
| 6. Pasco | 18,520 | 1 | 5.40 | 9 | 48.60 | 9 | 48.60 |
| 7. Wenatchee | 18,480 | 1 | 5.41 | 22 | 119.05 | 15 | 81.17 |
| 8. Port Angeles | 17,260 | 0 | 0.00 | 13 | 75.32 | 13 | 75.32 |
| 9. Aberdeen | 17,000 | 2 | 11.76 | 12 | 70.59 | 13 | 76.47 |
| 10. Mountlake Terrace | 16,060 | 0 | 0.00 | 4 | 24.91 | 3 | 18.68 |
| 11. Lacey | 15,840 | 1 | 6.31 | 4 | 25.25 | 5 | 31.57 |

*Frequency per 100,000 population

# Heavy Trucks

## Overview

In 1987 6,243 heavy trucks were involved in collisions, for a 18.4% decrease over the four-year baseline. Registrations in 1987 totaled 168,600, a 9.6% increase over the four-year average. Based on this registration figure, the 1987 collision rate was 370.3 collisions per 10,000 registered trucks, a decrease of 25.4% over the previous four-year average.

There were 71 heavy trucks involved in fatal collisions during 1987. This was a 6.3% decrease compared to the baseline average. While the fatal collision rate was up slightly from the previous year, it was down 14.7% from the previous 4-year average rate of 4.9 deaths per 10,000 registered trucks (Table 8-1).

Table 8-1

SUMMARY OF HEAVY TRUCKS
Heavy Trucks Involved in Traffic Collisions

| Collision Severity/Exposure & Rates | Years | | | | | Previous 4 Year Average | % of Change 86 - 4 Year Average |
|---|---|---|---|---|---|---|---|
| | 1987 | 1986 | 1985 | 1984 | 1983 | | |
| Total Trucks Involved in Collisions | 6,243 | 7,983 | 8,605 | 7,472 | 6,525 | 7,646 | -18.4% |
| Trucks Involved in Fatal Collisions | 71 | 66 | 85 | 87 | 65 | 76 | -6.3% |
| Registration of Heavy Trucks* | 168,600 | 164,000 | 155,000 | 150,661 | 145,595 | 153,814 | 9.6% |
| Total Collision Rate** | 370.3 | 486.8 | 555.2 | 495.9 | 448.2 | 496.5 | -25.4% |
| Fatal Collision Rate** | 4.2 | 4.0 | 5.5 | 5.8 | 4.5 | 4.9 | -14.7% |

* Estimated
**Collisions per 10,000 registered trucks

## Location of Heavy Truck Collisions By Severity

In 1987, 55.6% of the heavy trucks involved in total collisions were in urban areas (Figure 8-1). In 1987 there were 13 heavy trucks involved in fatal accidents in urban areas, compared to 58 in the rural areas. These figures comprise an 18.3 - 81.7% urban/rural proportion of involvement in fatal accidents, (Figure 8-2). The 1987 heavy truck involvement in injury accidents was split, 823 urban to 955 rural. These figures are 46.3 - 53.7% urban/rural split (Figure 8-3).

**Figure 8-1**

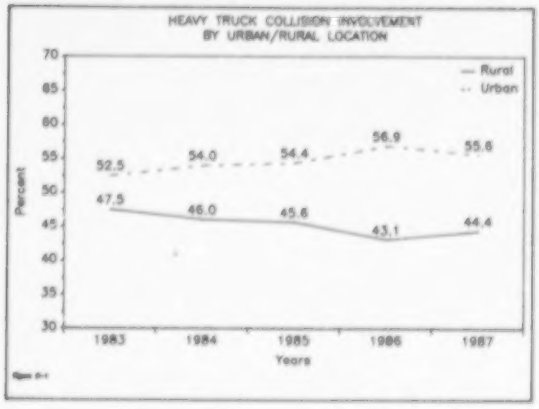



**Figure 8-2**

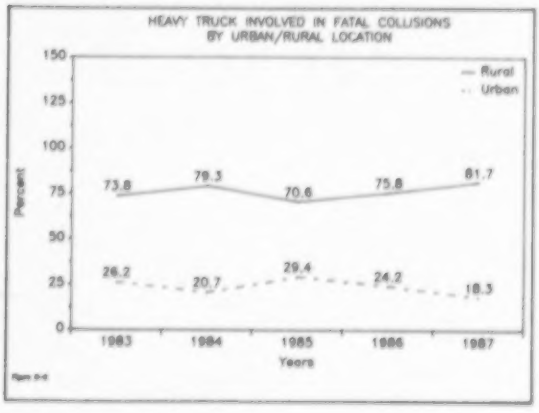
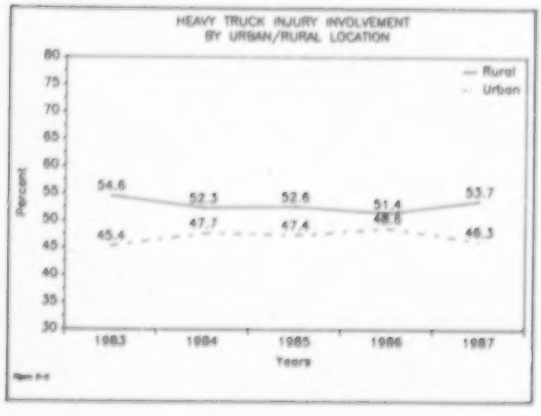



**Figure 8-3**



## Age of Drivers Involved in Heavy Truck Collisions

The 39 year old and younger drivers were over-represented in heavy truck collisions in 1987 compared to the percentage of licensed drivers each group comprised. The 19 and under group comprised 0.3% of all licensed heavy truck operators. Yet this group was involved in 1.8% of all heavy truck collisions, 2.9% of the heavy truck fatal crashes and 1.9% of the heavy truck injury collisions. The ratio for percent of collision involvement compared to percent of licensed drivers comprised by the 19 and under age group resulted in an over-representation ratio of 6.43 for this group. The 20-29 year old age group was involved in 28.4% of the total collisions, 27.1% of the fatal collision and 31.7% of the injury collisions. This group comprised 14.5% of all drivers having a classified endorsement on their licenses. Based on the percent of licensed drivers and collision involvement, this group was over-represented in collisions by a ratio of 1.95. The 30-39 year old age group was involved in 30.9% of the total reported collisions and made up 30% of the drivers having a classified endorsement on their license. The representation for this group was equal. The rest of the driver age groups were under-represented in total collisions (Table 8-2).

Table 8-2

DRIVERS INVOLVED IN HEAVY TRUCK COLLISIONS
By Age

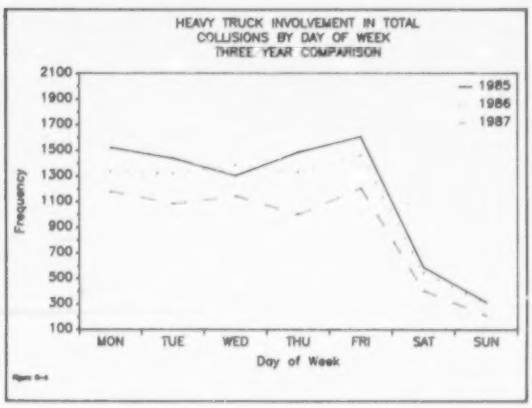
| Age | All Accidents | | Fatal Accidents | | Injury Accidents | | % of Classified Drivers* | Over/Under Ratio** |
|---|---|---|---|---|---|---|---|---|
| | Number | % | Number | % | Number | % | | |
| 19 & Under | 102 | 1.8% | 2 | 2.9% | 31 | 1.9% | 0.28 | 6.43 |
| 20-29 | 1,575 | 28.4% | 19 | 27.1% | 527 | 31.7% | 14.54 | 1.95 |
| 30-39 | 1,715 | 30.9% | 21 | 30.0% | 488 | 29.3% | 30.05 | 1.00 |
| 40-49 | 1,194 | 21.5% | 17 | 24.3% | 342 | 20.6% | 25.52 | 0.84 |
| 50-59 | 707 | 12.8% | 9 | 12.9% | 198 | 11.9% | 16.58 | 0.77 |
| 60 & Over | 250 | 4.5% | 2 | 2.9% | 78 | 4.7% | 13.04 | 0.35 |

* Classified Endorsement is only required for operators of the larger trucks and truck combinations
** Percent of collision involvement to percent of licensed drivers

## Heavy Truck Collision Occurrences By Time

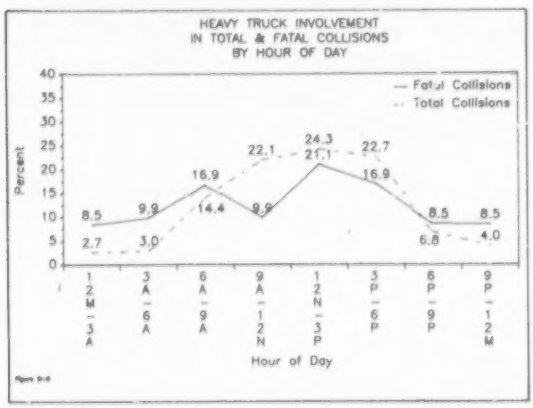
The weekdays had the highest frequencies of heavy truck collision involvement with Friday recording the single day high followed by Monday and Wednesday. During the weekends, as expected, there was a substantial decline in the frequency of heavy truck involvement in collisions (Figure 8-4).

Figure 8-4




In 1987, the time period from noon to 3 p.m. recorded the highest incidence of heavy truck involvement in collisions. A substantial increase in collisions commenced during the 6 a.m. to 9 a.m. time period, peaking at the noon to 3 p.m. period, remaining high during the 3 p.m. to 6 p.m. period and then taking a sharp decline (Figure 8-5).

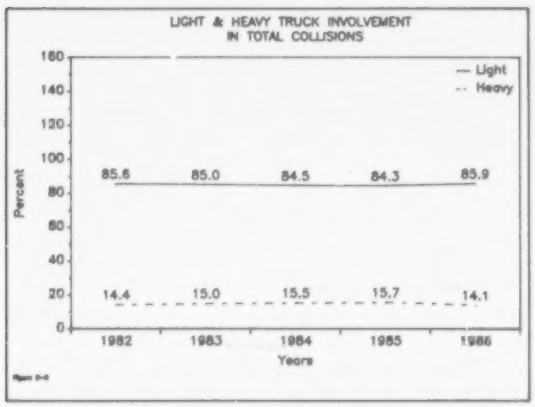
Figure 8-5




## Total Collisions - Light Trucks vs. Heavy Trucks

In 1987 there were 53,714 light trucks and 6,447 heavy trucks involved in collisions. This 89.3% - 10.7% ratio between light and heavy trucks represents a slight change from the ratios of the previous three years (Figure 8-6).

**Figure 8-6**




## Collisions By First Harmful Event

During 1987 heavy trucks were involved in 4,595 collisions involving other moving motor vehicles. This figure represents 73.6% of all heavy truck collisions. Heavy trucks also were involved in 440 collisions in which the other vehicle was parked and in 636 collisions with fixed or other objects. Overturning, other non-collisions and all other collisions accounted for the remaining heavy truck-involved collisions (Table 8-3).

Table 8-3

HEAVY TRUCK COLLISIONS BY FIRST HARMFUL EVENT
Four Year Comparison

| Type of Collision | 1987 | | 1986 | | 1985 | | 1984 | |
|---|---|---|---|---|---|---|---|---|
| | Number | % of Total | Number | % of Total | Number | % of Total | Number | % of Total |
| Collision with other moving motor vehicles | 4,595 | 73.6% | 5,686 | 73.7% | 6,042 | 73.2% | 5,170 | 72.4% |
| Collision with parked vehicle | 440 | 7.0% | 600 | 7.8% | 643 | 7.8% | 507 | 7.1% |
| Collision with fixed/other object | 636 | 10.2% | 792 | 10.3% | 884 | 10.7% | 801 | 11.2% |
| Overturning | 379 | 6.1% | 386 | 5.0% | 414 | 5.0% | 409 | 5.7% |
| Other non-collision | 107 | 1.7% | 116 | 1.5% | 153 | 1.9% | 139 | 1.9% |
| All other collisions* | 86 | 1.4% | 130 | 1.7% | 116 | 1.4% | 117 | 1.6% |

* Pedestrians, pedalcyclists, RR train & animal.

## Heavy Truck Defects

In 1987 defective brakes accounted for 39.6% of the defects detected in heavy trucks involved in collisions. Other defects and the percentages were worn or smooth tires, 12.3%; defective steering, 4.7%; defective rear lights, 4.2%; and all other defects, 35.6% (Table 8-4).

Table 8-4

DEFECTS OF HEAVY TRUCKS INVOLVED IN COLLISIONS
Four Year Comparison

| Condition of Vehicle | 1987 Number | 1987 % of Total | 1986 Number | 1986 % of Total | 1985 Number | 1985 % of Total | 1984 Number | 1984 % of Total |
|---|---|---|---|---|---|---|---|---|
| Defective Brakes | 254 | 39.6% | 329 | 42.1% | 325 | 41.1% | 359 | 44.0% |
| Defective Headlights | 6 | 0.9% | 4 | 0.5% | 7 | 0.9% | 6 | 0.7% |
| Defective Rear Lights | 27 | 4.2% | 48 | 6.1% | 49 | 6.2% | 61 | 7.5% |
| Defective Steering Mechanism | 30 | 4.7% | 33 | 4.2% | 37 | 4.7% | 28 | 3.4% |
| Puncture or Blowout | 23 | 3.6% | 21 | 2.7% | 29 | 3.7% | 37 | 4.5% |
| Worn or Smooth Tires | 79 | 12.3% | 87 | 11.1% | 101 | 12.8% | 93 | 11.4% |
| Other Defects | 222 | 34.6% | 259 | 33.2% | 243 | 30.7% | 231 | 28.3% |

# Pupil Transportation

## Overview

In the 1985-87 school year there were 310 reported school bus collisions in which 169 persons were injured and 5 persons were killed. This represented a 3.7% increase over the previous three-year average in total school bus collisions an 18.2% increase in the number of persons injured and an increase of 4 in the number killed. Injuries to pupils riding in the school buses totaled 59 for the 1986/87 school year; up 63.9% from the average of 36 pupils injured in the three-year baseline period. There were 6,185 registered school buses in the 1986-87 school year. This marked a 0.2% decrease in registrations from the baseline period. School bus travel increased 11.1 during the 1986-87 school year compared to the previous three-year baseline period (Table 9-1).

Table 9-1

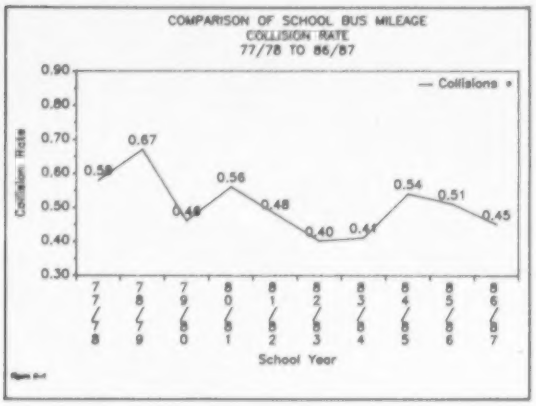
COLLISIONS INVOLVING SCHOOL BUSES
Four Year Comparison

| Severity, Exposure & Rates | Years | | | | Previous 3 Year Average | % of Change 86 - 3 Year Average |
|---|---|---|---|---|---|---|
| | 86-87 | 85-86 | 84-85 | 83-84 | | |
| Total Collisions | 310 | 338 | 310 | 248 | 299 | 3.79% |
| Fatal Collisions | 5 | 0 | 2 | 0 | 1 | 650.00% |
| Injury Collisions | 92 | 95 | 91 | 75 | 87 | 5.75% |
| Property Damage Collisions | 213 | 243 | 217 | 173 | 211 | 0.95% |
| Number Killed | 5 | 0 | 2 | 0 | 1 | 650.00% |
| Persons Injured | | | | | | |
| Pupils | 59 | 29 | 28 | 50 | 36 | 65.42% |
| School Bus Drivers | 9 | 19 | 23 | 11 | 18 | -49.06% |
| Other Occupants of School Bus | 1 | 2 | 0 | 4 | 2 | -50.00% |
| Pedestrian/Bicyclist | 7 | 5 | 4 | 6 | 5 | 40.00% |
| Occupants/Other Vehicles Involved | 93 | 92 | 85 | 71 | 83 | 12.50% |
| Total Injured | 169 | 147 | 140 | 142 | 143 | 18.18% |
| School Bus Registration | 6,185 | 6,121 | 6,107 | 6,005 | 6,078 | 1.77% |
| Registration Collision Rate* | 50.1 | 55.2 | 50.8 | 41.3 | 49.1 | 2.09% |
| Miles Traveled (in thousands) | 68,658.8 | 66,586.6 | 57,849.3 | 61,042.7 | 61,826.2 | 11.05% |
| Mileage Collision Rate** | 0.45 | 0.51 | 0.54 | 0.41 | 0.483 | -6.57% |

* Collisions per 1,000 registered vehicles
** Collisions per 100,000

In 1986-87 school year, the school bus mileage collision rate was .45 collisions per 100,000 miles of travel (Figure 9.1). This rate was down from the 1985-86 rate of 0.51 and from the 0.48 rate of the previous three-year baseline (Figure 9-1).

**Figure 9-1**



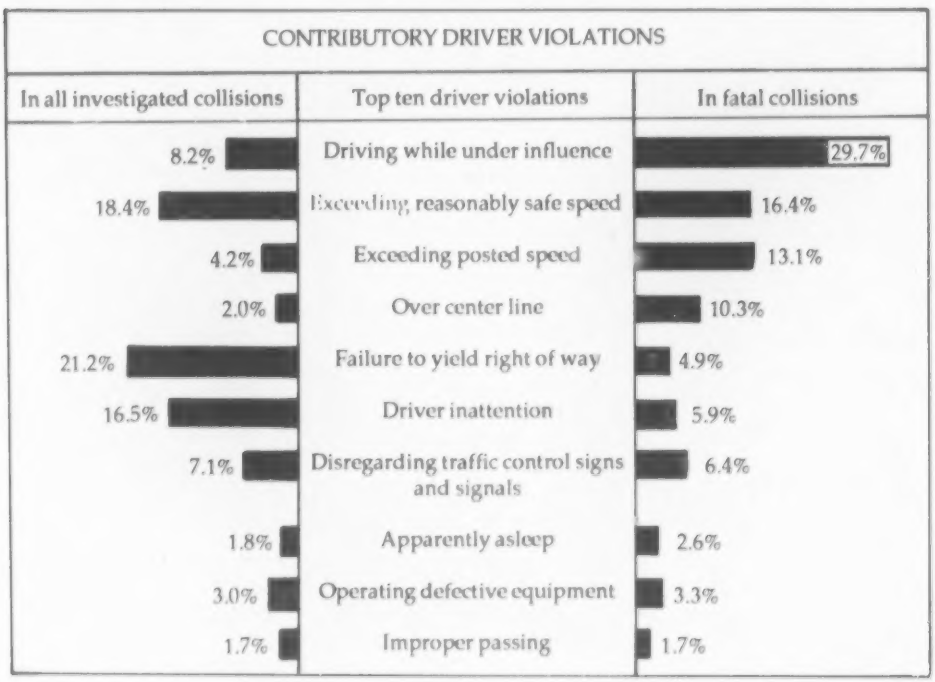

* Collisions Per 100,000 Miles Of Travel

# Contributory Driver Violations

## Overview

Driving while under the influence of intoxicating liquor contributed to 29.7% of the driver violations in fatal collisions and 8.2% of all investigated collisions. Failure to yield right of way contributed to 21.2% of all investigated collisions and 4.9% of the violations in fatal collisions (Figure 10-1).

**Figure 10-1**



# Vehicle Defects

## Overview

In investigated collisions during 1987, only 4.86% of the collision-involved vehicles were found to have contributory vehicle defects. The most common defect was worn or smooth tires, a defect found in 2,806 vehicles. This represented an 8.2% decrease in this category compared to the previous four-year average. Defective brakes, the second most contributory defect, was found on 1,961 collision-involved vehicles in 1987. This was an increase of 6.3% compared to the baseline (Table 10-1).

Table 10-1

VEHICLE CONDITION*
Five Year Comparison

| Description | Years | | | | | Previous 4 Year Average (83-86) | % of Change 87 - 4 Year Average |
|---|---|---|---|---|---|---|---|
| | 1987 | 1986 | 1985 | 1984 | 1983 | | |
| Defective Tires: | | | | | | | |
| Worn or Smooth Tires | 2,806 | 3,129 | 3,043 | 2,996 | 2,964 | 3,056 | -8.2% |
| Puncture or Blowout | 469 | 343 | 345 | 367 | 462 | 352 | 33.4% |
| Defective Brakes | 1,961 | 2,026 | 1,723 | 1,785 | 1,514 | 1,845 | 6.3% |
| Defective Lights: | | | | | | | |
| Headlights | 144 | 167 | 156 | 143 | 149 | 155 | -7.3% |
| Rear Lights | 331 | 373 | 370 | 394 | 361 | 379 | -12.7% |
| Other Lights/Reflectors | 116 | 112 | 97 | 122 | 95 | 110 | 5.1% |
| Defective Steering | 339 | 287 | 307 | 381 | 308 | 325 | 4.3% |
| All Other Defects | 2,082 | 2,026 | 1,963 | 1,439 | 1,387 | 1,809 | 15.1% |
| No Defects | 161,595 | 156,360 | 147,591 | 139,320 | 131,273 | 147,757 | 9.4% |
| TOTAL VEHICLES INVOLVED | 169,843 | 164,823 | 155,595 | 146,947 | 138,513 | 155,788 | 9.0% |

* Investigated Collisions

# Senior Driver Involvement

## Overview

Drivers 55 years old and older were involved in 24,473 reported collisions 149 fatal collisions and 8,896 injury collisions during 1987. This was a 0.6% increase in reported collisions, a 1.4% increase in fatal crashes but a decrease of 2.0% in injury crashes compared to the previous four-year baseline period. There were 741,653 licensed drivers 55 years old and older in 1987, up 6.8% from the baseline period. The fatal collision rate (total collisions per 1,000 licensed drivers) of 0.20 for 1987 was down 4.8% from the baseline period (Table 11-1).

Table 11-1

SENIOR DRIVER COLLISIONS - 55 YEARS & OLDER
Five Year Comparison

| Collisions & Rates | Years | | | | | Previous 4 Year Average | % of Change 85 - 4 Year Average |
|---|---|---|---|---|---|---|---|
| | 1987 | 1986 | 1985 | 1984 | 1983 | | |
| Total Collisions | 24,473 | 25,862 | 24,978 | 23,630 | 22,897 | 24,337 | 0.6% |
| Fatal Collisions | 149 | 140 | 144 | 149 | 153 | 147 | 1.7% |
| Injury Collisions | 8,896 | 9,560 | 9,266 | 8,855 | 8,643 | 9,081 | -2.0% |
| Licensed Drivers | 741,653 | 719,784 | 706,719 | 686,985 | 664,355 | 694,461 | 6.8% |
| Fatal Collision Ratio* | 6.09 | 5.42 | 5.77 | 6.31 | 6.68 | 6.04 | 0.8% |
| Fatal Rate** | 0.20 | 0.19 | 0.20 | 0.22 | 0.23 | 0.21 | -4.9% |
| Total Collision Rate*** | 3.30 | 3.59 | 3.53 | 3.44 | 3.45 | 3.50 | -5.8% |

* Fatal Collisions per 1,000 total collisions
** Fatal Collisions per 1,000 licensed drivers
*** Senior drivers involved per 100 licensed

## Senior Driver Involvement In Collisions By First Harmful Event

In 1987, 87.3% of those drivers 55 years and older who were involved in all reported collisions collided with other moving vehicles. This type of collision also resulted in the greatest percentage of fatal collisions (61.1%) and injury collisions (84.7%). Single vehicle collisions with a fixed object led to the second largest percentage of senior drivers involvement in total, fatal and injury collisions at 5.6%, 16.8% and 6.5% respectively. While collisions with pedestrians and bicycles comprised only 1.9% of the total senior driver collisions, this collision type contributed to 14.1% of the fatal crashes and 5.0% of the senior's injury collisions (Table 11-2).

Table 11-2

SENIOR DRIVER INVOLVEMENT IN COLLISIONS
By First Harmful Event

| Type of Collision | Total Collisions | | Fatal Collisions | | Injury Collisions | |
|---|---|---|---|---|---|---|
| | Number | % of Total | Number | % of Total | Number | % of Total |
| Collision with other moving motor vehicles | 21,358 | 87.3% | 91 | 61.1% | 7,535 | 84.7% |
| Collision with parked vehicle | 657 | 2.7% | 1 | 0.7% | 126 | 1.4% |
| Collision with fixed/other object | 1,380 | 5.6% | 25 | 16.8% | 574 | 6.5% |
| Overturning & other non collision | 354 | 1.4% | 8 | 5.4% | 187 | 2.1% |
| Collisions with pedestrian & bicycles | 476 | 1.9% | 21 | 14.1% | 448 | 5.0% |
| Other collisions including RR train, animal | 248 | 1.0% | 3 | 2.0% | 26 | 0.3% |
| TOTAL | 24,473 | 100.0% | 149 | 100.0% | 8,896 | 100.0% |

## Senior Driver Collision Involvement By Age Group

Failure to yield right-of-way contributed to 51.5% of the total drivers violations for drivers 75 years and older. This violation was also the leading violation for all drivers 55 years and older. This was followed by disregarding traffic control signs and signals for drivers 65 and over while speed, too fast for conditions was the second leading contributing cause for the drivers 55-59 group and the 60-64 year group (Table 11-3).

Table 11-3

SENIOR DRIVER COLLISIONS - 55 YEARS AND OLDER
Percent of Total Circumstances by Age Group

| Contributing Circumstances* | 55-59 | | 60-64 | | 65-69 | | 70-74 | | 75 & Older | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number | % | Number | % | Number | % | Number | % | Number | % |
| Failure to Yield Right of Way | 915 | 31.8% | 912 | 35.2% | 881 | 38.3% | 868 | 42.3% | 1,544 | 51.5% |
| Speed--Too Fast For Conditions | 372 | 12.9% | 274 | 10.6% | 211 | 9.2% | 191 | 9.3% | 181 | 6.0% |
| Disregarding Traffic Signal/Signs | 249 | 8.7% | 232 | 9.0% | 246 | 10.7% | 221 | 10.8% | 357 | 11.9% |
| Following Too Closely | 245 | 8.5% | 229 | 8.8% | 198 | 8.6% | 135 | 6.6% | 158 | 5.3% |
| Driving While Under the Influence | 216 | 7.5% | 121 | 4.7% | 89 | 3.9% | 51 | 2.5% | 27 | 0.9% |
| Operating Defective Equipment | 66 | 2.3% | 61 | 2.4% | 26 | 1.1% | 30 | 1.5% | 25 | 0.8% |
| Crossing Over the Centerline | 38 | 1.3% | 40 | 1.5% | 27 | 1.2% | 29 | 1.4% | 25 | 0.8% |
| Exceeding Legal Speed | 44 | 1.5% | 14 | 0.5% | 14 | 0.6% | 9 | 0.4% | 6 | 0.2% |
| All Other Circumstances Including Driver Inattention | 732 | 25.4% | 705 | 27.2% | 608 | 26.4% | 517 | 25.2% | 677 | 22.6% |
| TOTAL | 2,877 | 100.0% | 2,588 | 100.0% | 2,300 | 100.0% | 2,051 | 100.0% | 3,000 | 100.0% |

*Investigated collisions only

In 1987 the 55-59 year old group was involved in 6,917 reported collisions for 3.56% of all collisions. This group made up 5.56% of the total number of drivers licensed to drive in this state. The under-representation ratio of 0.64 was the same as reported for the previous year but down slightly from the previous four-year baseline average (Figure 11-1). The 60-64 age group post an under-representation ratio of 0.57, down slightly from the previous four-year baseline average (Figure 11-2). The 65-69 year old group recorded a 0.52 under-representation ratio, down from the .54 four-year average (Figure 11-3).

The 70-74 age group recorded a 0.55 under-representation ratio; the same as the .55 baseline average (Figure 11-4). The last group is the 75 years old and older group. This group had a .61 under-representation, down from the baseline ratio of .64 (Figure 11-5).

**Figure 11-1**

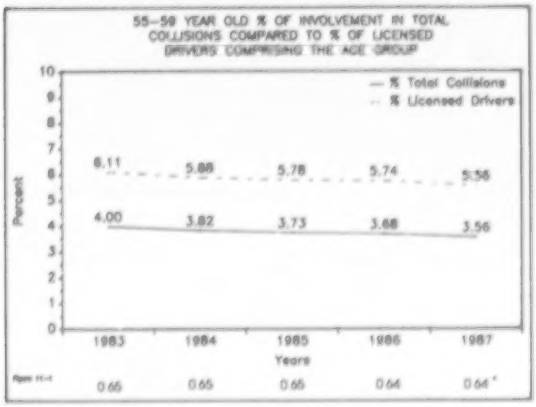



**Figure 11-2**

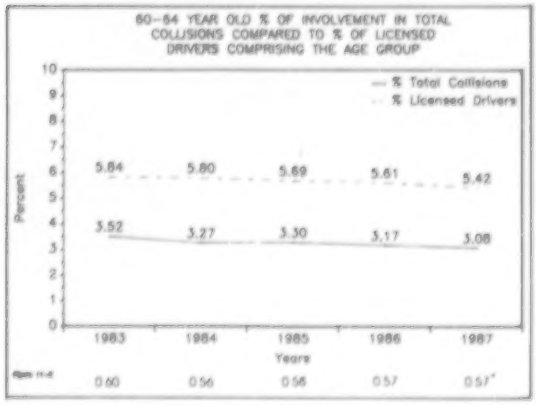



**Figure 11-3**

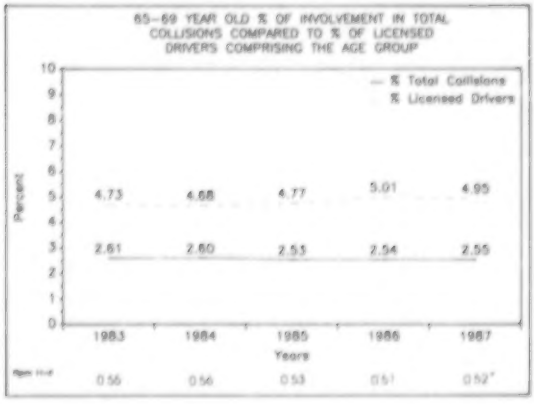


**Figure 11-4**

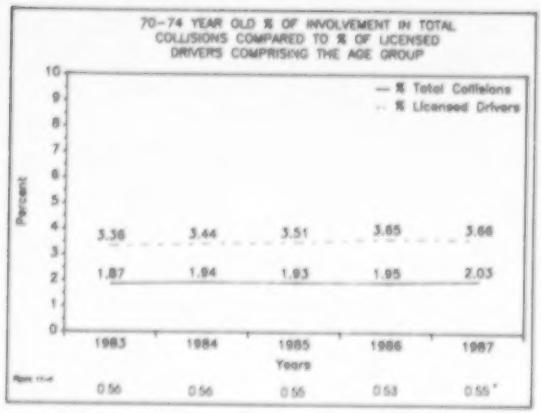
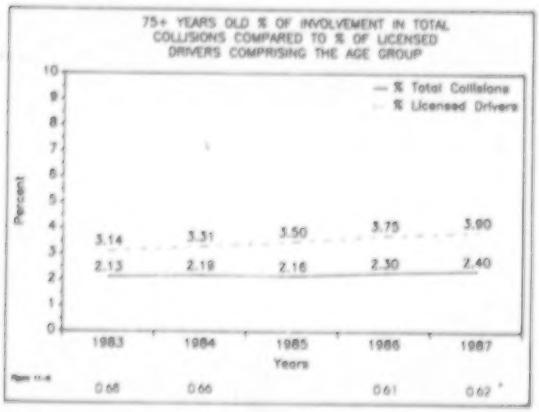



**Figure 11-5**




The urban/rural collision ratio involving senior drivers (55 years old and older) remained relatively constant during the past four years with a 65.4/34.6 urban/rural mix for 1987. The senior driver injury collision urban/rural mix has also remained fairly constant during the past four years. Senior driver fatal collisions continued to be more common in rural areas. In 1987, 71.1% or nearly three fourths of the fatal collisions involving senior drivers occurred in rural areas (Figure 11-8).

**Figure 11-6**

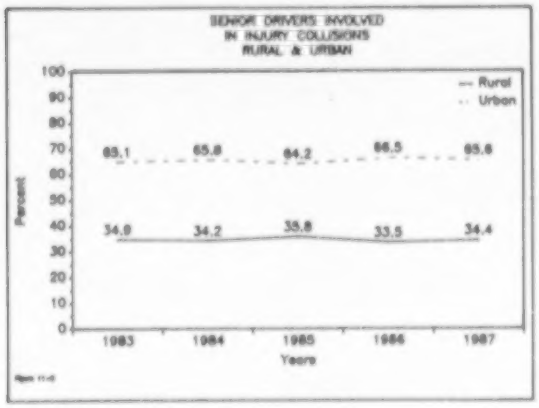



**Figure 11-7**

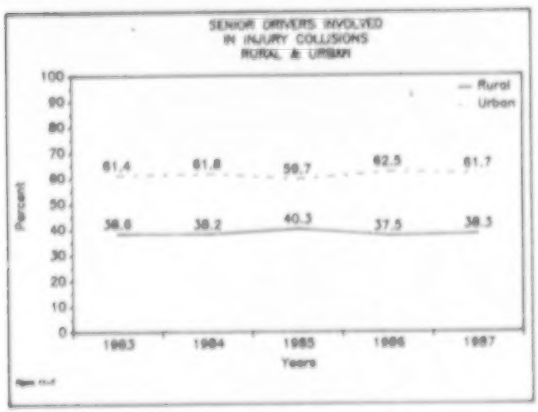
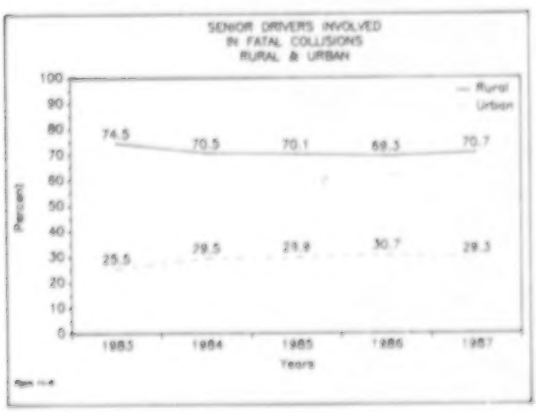



**Figure 11-8**



## Senior Driver Involvement By Time

In 1987, 18.0% of all rural fatal collisions involving senior drivers occurred on Friday, 17% occurred on Saturday and 16% occurred on Wednesday. Friday was also the high day of the week for total reported rural collision, recording 17.3% of the senior driver collisions followed by Thursday with 15.3% Wednesday recorded 14.6% and Monday 14.4% of the collisions (Figure 11-9). Thursday was the highest fatal collision day recording 25.6% of the senior drivers urban area collisions. Friday recorded the greatest percentage of urban total reported collisions (18.3%) for the group (Figure 11-10).

**Figure 11-9**

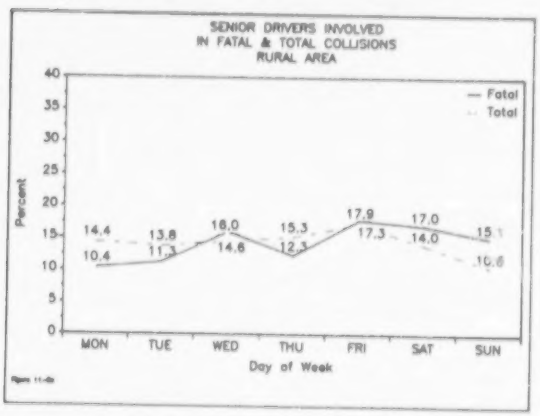
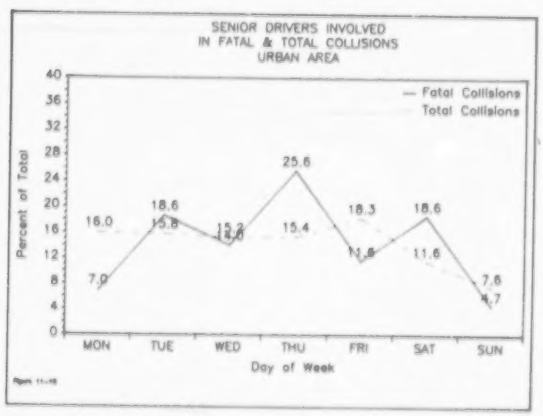



**Figure 11-10**




In rural areas, the greatest percentage (25.5%) of senior driver involvement in fatal crashes in 1987 occurred from 3 p.m. to 6 p.m.. The greatest percentage of total collision involvement (29.1%) for these drivers also occurred from 3 p.m. to 6 p.m. (Figure 11-11). In the urban areas, the greatest senior involvement by time period in fatal collisions was 32.6% in the 3 p.m. to 6 p.m. period. This same time frame recorded 29.4% of the total urban reported collisions of the senior drivers (Figure 11-12).

**Figure 11-11**

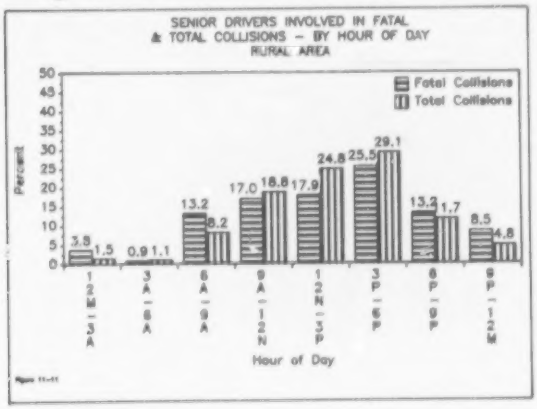



**Figure 11-12**